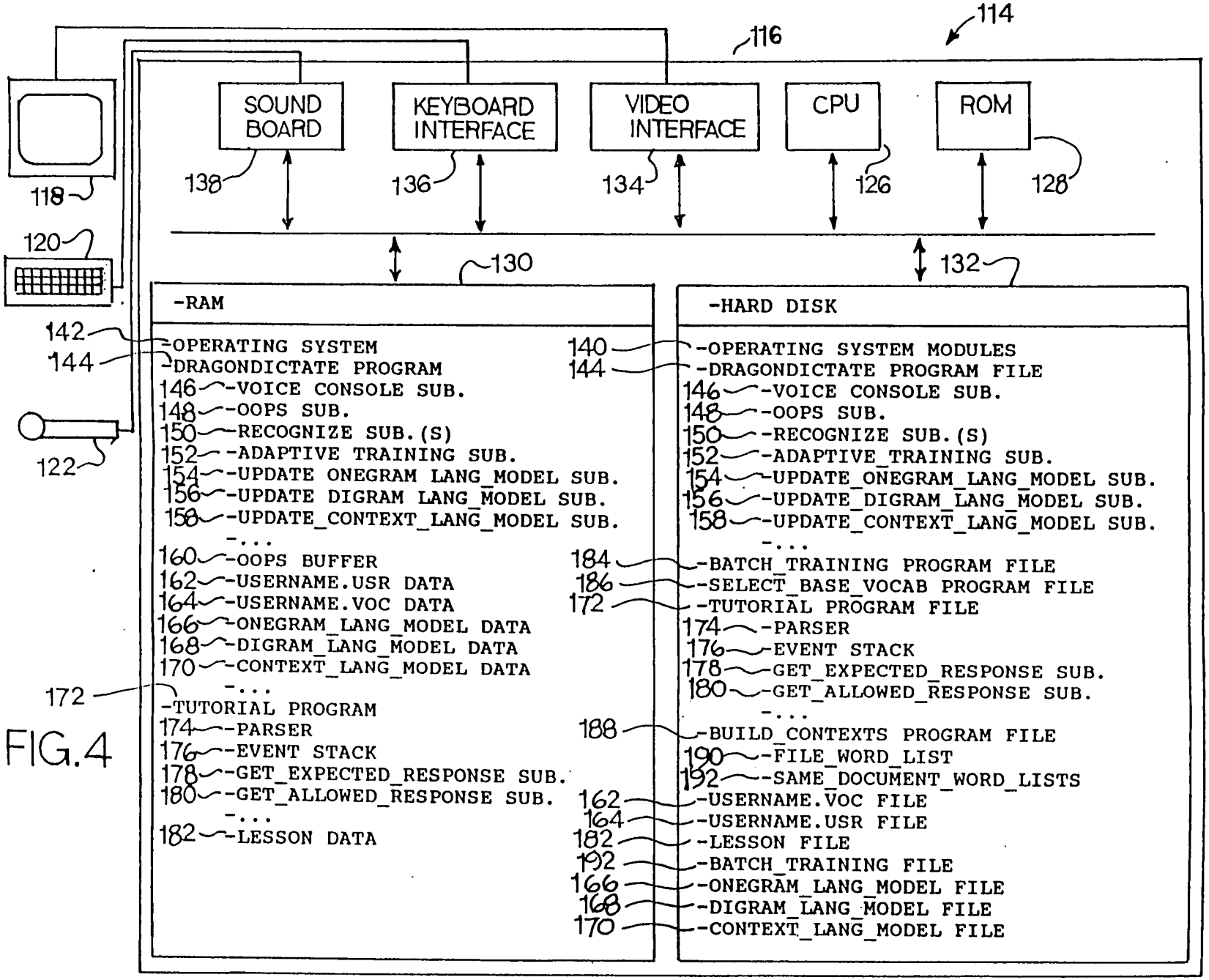


FIG.4

```
-DRAGONDICTATE PROGRAM~144
    -INITIALIZE~204
    -TERMINATE AND STAY RESIDENT~206
    -GET USER INPUT BY MONITORING KEYSTROKE INTERRUPTS AND, IF
    MICROPHONE IS ON, UTTERANCE INTERRUPTS~208
    -IF RECEIVED KEYSTROKE IS:~210
        -"+", CALL VOICE CONSOLE SUBROUTINE
        -"-", CALL OOPS BUFFER SUBROUTINE
        -...
        -ANY OTHER KEY, PASS TO ACTIVE PROGRAM
    -IF RECEIVE UTTERANCE~212
        -CALL RECOGNIZER~214
        -IF BEST SCORING WORD IS:~216
            -CHOICE COMMAND SELECTING A WORD IN ALTERNATE CHOICE
            WINDOW~226
                -IF CHOICE COMMAND SELECTS OTHER THAN BEST SCORING
                WORD~228
                    -SIMULATE TYPING NUMBER OF BACKSPACE CHARACTERS
                    EQUAL TO NUMBER OF CHARACTERS IN FIRST CHOICE
                    WORD~230
                    -SIMULATE TYPING CHARACTERS OF SELECTED WORD~232
                -REMOVE CHOICE WINDOW~234
                -MAKE SELECTED WORD FIRST CHOICE~236
                -SET UTTERANCE'S CONFIRMED_FLAG~254
                -CALL ADAPTIVE_TRAINING SUBROUTINE FOR CONFIRMED
                UTTERANCE AND FIRST CHOICE WORD~256
            -"CHOOSE-10", OR "SCRATCH THAT"~360
                -BACKSPACE NUMBER OF CHARACTERS IN BEST SCORING
                WORD~362
                -REMOVE CHOICE WINDOW~364
                -REMOVE UTTERANCE'S ENTRY IN OOPS BUFFER~366
            -"OOPS"~368
                -CALL OOPS_SUBROUTINE~370
            -...
            -NOT ONE OF ABOVE COMMANDS~218
                -REMOVE PREVIOUS CHOICE WINDOW IF ANY~223
                -SIMULATE TYPING OF UTTERANCE'S BEST SCORING
                WORD~220
                -PLACE CHOICE WINDOW ON SCREEN NEAR CURSOR~222
                -IF CONFIRMED_TRAINING_ONLY_FLAG IS FALSE OR IF THE
                CONFIRMED_FLAG OF THE OLDEST ENTRY IN THE OOPS
                BUFFER IS SET~392
                    -CALL ADAPTIVE TRAINING SUBROUTINE FOR TOKEN OF
                    THE OLDEST ENTRY IN THE OOPS BUFFER AGAINST THAT
                    ENTRY'S FIRST CHOICE WORD, UNLESS ALREADY
                    DONE~394
                        -CALL UPDATE ONEGRAM, UPDATE DIGRAM, AND
                        UPDATE CONTEXT LANG MODEL SUBROUTINES BASED
                        ON OLDEST ENTRY'S FIRST CHOICE WORD~396
```

FIG. 5A

```
            -IF SAVING_TOKEN_FLAG IS SET, SAVE OLDEST
            ENTRY'S TOKEN LABELED WITH ITS FIRST CHOICE WORD
            IN A FILE, BUFFERING SAVES TO REDUCE DISK
            ACCESS~398
        -ADD NEW ENTRY TO OOPS BUFFER FOR LAST UTTERANCE,
        INCLUDING ITS TOKEN, NINE BEST SCORING WORDS, AND A
        ZEROED CONFIRM_FLAG~400
```

FIG. 5B.

```
-VOICE CONSOLE SUBROUTINE~146
    -IF SYSTEM HAS ONE OR MORE USER FILES DEFINED~402
        -ENABLE FULL VOICE CONSOLE MENU
    -IF NOT~404
        -LIMITED VOICE CONSOLE MENU TO LOAD USER OR EXIT
    -VOICE CONSOLE LOOP~406
        -CLEAR OTHER PROMPTS, IF ANY, AND DISPLAY VOICE CONSOLE
        MENU~408
        -GET USER INPUT~410
        -IF INPUT IS:~412
            -"LOAD USER"~414
                -PROMPT FOR USER NAME~416
                -GET INPUT~420
                -IF USER ENTERS A NEW USER NAME~422
                    -PROMPT IF WANT TO CREATE NEW USER~424
                    -IF NOT, RETURN TO TOP OF VOICE CONSOLE LOOP~426
                    -IF SO~428
                        -PROMPT IF WANT TO RUN TUTORIAL~430
                        -IF USER SELECTS YES~432
                            -EXIT VOICE CONSOLE
                            -LOAD AND RUN TUTORIAL
                        -ELSE~434
                            -EXIT VOICE CONSOLE
                            -LOAD AND RUN SELECT_BASE_VOCAB PROGRAM
                -SELECT USER'S .VOC AND .USR FILES FOR USE BY
                RECOGNIZER~446
                -EXIT VOICE CONSOLE~448
            -...
            -"UTILITIES"~450
                -DISPLAY UTILITIES MENU~452
```

FIG. 6A

```
                    -GET INPUT~452
            -IF INPUT IS:
            -...
                -"PARAMETERS",~454
                    -DISPLAY PARAMETERS MENU~456
                    -GET INPUT~456
                    -IF INPUT IS
                        -...
                        -"CONFIRMED TRAINING ONLY", SET
                        CONFIRMED_ TRAINING_ONLY_FLAG~468
                        -"SAVE TOKEN", SET SAVE_TOKEN_FLAG~460
                        -...
                    -...
            -...
        -...
```

FIG. 6B

```
-OOPS SUBROUTINE~148
    -MAKE 2ND MOST RECENT UTTERANCE IN OOPS BUFFER THE CURRENT OOPS
    WORD~372
    -REPEAT UNTIL EXIT FROM WITHIN~374
        -DISPLAY OOPS MENU WITH ONLY CURRENT OOPS WORD HAVING
        ALTERNATE CHOICES SHOWN~376
        -GET INPUT~378
        -IF INPUT IS:~380
            -CHOOSE-1 OR OKAY, REMOVE OOPS MENUS, MAKE ALL
            CORRECTIONS TO OUTPUT, AND EXIT OOPS SUBROUTINE~381
            -CHOOSE-2, SELECT SECOND CHOICE WORD, REMOVE OOPS MENUS,
            MAKE ALL CORRECTIONS TO OUTPUT, AND EXIT OOPS
            SUBROUTINE~382
            -...~386
            -SELECT-1, REMOVE ALTERNATE CHOICE MENU FROM CURRENT
            OOPS WORD~383
            -SELECT-2, REMOVE ALTERNATE CHOICE MENU FROM CURRENT
            OOPS WORD, MAKE SECOND CHOICE WORD THE FIRST CHOICE~384
            -...~386
            -LEFT-1, MAKE WORD ONE LEFT OF CURRENT OOPS WORD THE
            CURRENT OOPS WORD~388
            -LEFT-2, MAKE WORD TWO LEFT OF CURRENT OOPS WORD THE
            CURRENT OOPS WORD~390
            -...~386
            -RIGHT-1, MAKE WORD ONE RIGHT OF CURRENT OOPS WORD THE
            CURRENT OOPS WORD~394
            -...~386
```

FIG. 7

-OOPS BUFFER~160
-ENTRY1
-ENTRY2
-ENTRY3~238
-ENTRY4
-ENTRY5~238
-ENTRY6~238
-ENTRY7
-ENTRY8
-ENTRY9
-ENTRY10
-ENTRY11
-ENTRY12
-READ/WRITE POINTER~240

FIG. 8

-OOPS BUFFER ENTRY~238
-TOKEN~244
-WORD_1~246A
-WORD_2
-WORD_3~246
-WORD_4
-WORD_5~246
-WORD_6~246
-WORD_7
-WORD_8
-WORD_9
-VOCABULARY~248
-STATE~250
-CONFIRMED_FLAG~252

FIG. 9

-USERNAME.VOC FILE~162
-LIST OF WORDS~260
-FOR EACH
-WORD~263
-PHONEME SPELLING LIST~262
-PHONETIC SPELLINGS~263
-PREFILTERING WORD START~264
-LIST OF STATES~266
-FOR EACH
-STATE~267
-LIST OF WORDS OR INCLUDED STATES~268
-FOR EACH
-WORD OR STATE~269

FIG. 10A

-TRANSITION TO ANOTHER STATE~270
-EXTRA DATA (SUCH AS KEYSTROKE SEQUENCE)~272
-DEFAULT TRANSITION~274
-DEFAULT EXTRA DATA~276

FIG. 10B

-USERNAME.USR FILE~164
-PREFILTERING MODELS~280
-PIC TABLE~282
-FOR EACH PHONEME TRIPLE
-ITS ASSOCIATED SEQUENCE OF PELS~284
-DURATION MODEL~286
-PEL MODEL LIST~288
-FOR EACH PEL
-PEL ID~291
-1 AMPLITUDE PARAMETER~290
-7 SPECTRAL PARAMETERS~292
-12 CEPSTRAL PARAMETERS~294
-HELPER MODEL LIST~296
-FOR EACH WORD FOR WHICH USER UTTERANCES SCORE POORLY AGAINST PHONETIC MODEL
-WORD~298
-PHONETIC MODEL OF WORD, IF ANY~300
-SEQUENCE OF PELS~302
-PREFILTERING WORD START~303

FIG. 11

-ADAPTIVE_TRAINING SUBROUTINE~152
-ADJUST WEIGHT TO BE GIVEN TOKEN IN TRAINING ACCORDING TO SUCH FACTORS AS STATE OF CONFIRMED_FLAG~304
-CALL WORD_TRAINING FOR WORD, TOKEN, AND WEIGHT~306

FIG. 12

-TRAINING SUBROUTINE (TOKEN LIST, WORD MODEL)~326
-FOR EACH TOKEN IN TOKEN LIST~330
-TIME ALIGN AND SCORE PARAMETER VECTORS OF TOKEN AGAINST PELS OF WORD MODEL~332
-UPDATE PELS OF WORD MODEL WITH VECTORS TIME ALIGNED AGAINST THEM~334

FIG. 13

```
-TRAIN_NEW_MODEL SUBROUTINE (TOKEN LIST)~336
    -SET PEL_NUMBER IN PROPORTION TO AVERAGE LENGTH OF TOKENS IN
    TOKEN LIST~338
    -DIVIDE EACH TOKEN INTO PEL_NUMBER SEGMENTS OF APPROXIMATELY
    EQUAL LENGTH~340
    -MAKE AN INITIAL MODEL FOR THE WORD WITH A PEL FOR EACH OF THE
    PEL_NUMBER SEGMENTS MADE IN THE TOKENS, WITH EACH PEL'S
    PARAMETERS BEING BASED ON THE VECTORS OF THE ONE OR MORE TOKENS
    IN ITS ASSOCIATED SEGMENT~342
    -REPEAT UNTIL ITERATION IMPROVES SCORE OF MATCHES BY LESS THAN
    SPECIFIED AMOUNT~344
        -FOR EACH TOKEN IN TOKEN LIST~346
            -TIME ALIGN AND SCORE PARAMETER VECTORS OF TOKEN AGAINST
            PELS OF WORD MODEL~348
        -UPDATE PELS OF WORD MODEL~350
```

FIG. 14

```
-BATCH_TRAINING PROGRAM~184
    -FOR EACH WORD FOR WHICH HAVE TOKENS~464
        -CALL WORD_TRAINING FOR THE WORD AND ITS TOKEN~466
```

FIG. 15

```
-SELECT_BASE_VOCAB PROGRAM~186
    -DISPLAY SENTENCE AND PROMPT USER TO SEPARATELY SPEAK EACH
    HILITED WORD IN THAT SENTENCE~436
    -FOR EACH WORD IN SENTENCE, STARTING WITH FIRST~438
        -HILITE WORD
        -GET NEXT UTTERANCE
        -LABEL UTTERANCE'S TOKEN AS BEING FOR HILTITED WORD
    -SCORE EACH UTTERANCE'S TOKEN AGAINST ITS LABELED WORD IN EACH
    OF BASE VOCABULARIES~440
    -ADD SCORES OF ALL UTTERANCES FOR EACH VOCABULARY~442
    -SELECT BASE VOCABULARY WITH BEST SCORE, BASING USER'S .VOC AND
    .USR FILES ON SELECTED BASE VOCABULARY~444
```

FIG. 16

```
-TUTORIAL PROGRAM~172
    -INITIALIZE~460
    -REPEAT UNTIL EXIT FROM WITHIN~461
        -GET NEXT LINE OF LESSON FILE~462
        -INTERPRET AND EXECUTE THAT LINE~463
```

FIG. 17

```
-LESSON FILE~182
    -CHAPTER1--BASE FILE SELECTION~464A
        -SET DEFAULTS FOR CHAPTER~475
        -LESSION~468A
            -DISPLAY INTRODUCTORY SCREEN
            -GET INPUT
        -...
        -SELECT BASE FILE LESSON~468B
            -RUN SELECT_BASE_VOCAB
        -...
    -CHAPTER2--INTRODUCTION TO TUTORIAL~464
    -CHAPTER3--HOW DRAGONDICTATE WORDS~464
    -CHAPTER4--THE VOICE CONSOLE AND DISABLING THE MICROPHONE~464
    -CHAPTER5--LEARNING TO DICTATE
    -CHAPTER6--BASIC PUNCTUATION
    -CHAPTER7--CORRECTING DICTATION WITH THE CHOICE LIST~464B
    -CHAPTER8--DELETING UTTERANCES WITH [CHOOSE 10]
    -CHAPTER9--SPELLING WORDS NOT ON CHOICE LIST
    -CHAPTER10-THE DICTIONARY AND ADDING NEW WORDS
    -CHAPTER11-CORRECTING OLD ERRORS WITH THE OOPS BUFFER
    -CHAPTER12-DICTATING DATES, NUMBERS, AND ADDRESSES
    -CHAPTER13-SAVING YOUR VOCABULARY FILES
    -...
    -CHAPTERN~464C
        -SET DEFAULTS FOR CHAPTER
        -BATCH TRAINING LESSON~468C
            -PROMPT USER IF WANTS TO PERFORM BATCH TRAINING~486
            -IF USER SAYS YES, CALL BATCH_TRAINING~488
            -ELSE, CONTINUE TO NEXT LESSION
            -...
        -EXIT LESSON~468D
            -PROMPT USER IF WANTS TO EXIT TUTORIAL~490
            -IF USER SAYS YES, EXIT TUTORIAL~492
            -ELSE, PROMPT USER TO CALL TUTOR MENU FOR OPTIONS~494
            -...
    -...
    -DICTATION MODULE~466A
    -GLOBAL MODULE~466B
    -TUTOR MENU MODULE~466C
        -SET DEFAULTS FOR MODULE
        -DISPLAY TUTOR MENU
        -GET IMPUT
        -BRANCH BASEDD ON INPUT
    -...
```

FIG. 18

-CHAPTER~464
    -SET DEFAULTS FOR CHAPTER~469
    -LESSON~468
        -OPTIONALLY DISPLAY MESSAGE~470A
        -OPTIONALLY FAKE DICTATION ACTION~470B
        -OPTIONALLY ADD ENTRIES TO STACK~470C
        -GET INPUT~470D
        -CONTINUE OR BRANCH BASED ON INPUT~470E
    -LESSON~468
    -LESSON~468
    -...

FIG. 19

-GET_EXPECTED_RESPONSE SUBROUTINE~178
    -CALL GET_ALLOWED_RESPONSE SUBROUTINE~520
    -IF RETURNS EXPECTED WORD AS USER RESPONSE~522
        -RETURN
    -IF RETURNS OTHER ALLOWED RESPONSE IN EVENT STACK~524
        -EXECUTE FUNCTION FOLLOWING THAT ALLOWED RESPONSE IN EVENT STACK
    -IF FUNCTION CALLED FROM EVENT STACK RETURNS WITH A "REPEAT", JUMP TO START OF THIS SUBROUTINE~525

FIG. 20

-GET_ALLOWED_RESPONSE SUBROUTINE~180
    -SET UTTERANCE_NUMBER TO 0~526
    -UTTERANCE_LOOP: REPEAT UNTIL EXIT FROM WITHIN~528
        -INCREMENT UTTERANCE_NUMBER~530
        -WAIT FOR USER INPUT~532
        -IF KEYSTROKE, RETURN WITH KEY AS RESPONSE~534
        -CALL LARGE VOCABULARY RECOGNIZER TO SCORE UTTERANCE'S TOKEN AGAINST LARGE VOCABULARY, REQUESTING SCORE OF BEST SCORING 25 WORDS~536
        -SET USER_RESPONSE TO ZERO~538
        -WORD_LIST_LOOP: FOR EACH WORD RETURNED BY THE RECOGNIZER, IN ORDER OF SCORE WITH BEST SCORING FIRST~540
            -IF ITS SCORE IS WORSE THAN A GIVEN LEVEL~542
                -EXIT WORD_LIST_LOOP
            -IF IT IS AN ALLOWED RESPONSE WORD~546
                -SET USER_RESPONSE TO THE BEST SCORING ALLOWED RESPONSE WORD~548

FIG. 21A

-CALL ADAPTIVE_TRAINING SUBROUTINE FOR TOKEN, AND ANY SIMILAR TOKEN[X]s FROM PREVIOUS LOOP, AND BEST SCORING ALLOWED RESPONSE WORD, IF THAT WORD IS THE EXPECTED WORD~550

-LABEL TOKEN WITH BEST SCORING ALLOWED RESPONSE WORD, IF THAT WORD IS THE EXPECTED WORD~552

-RETURN~553

-IF USER_RESPONSE IS ZERO~554

-SAVE TOKEN AS TOKEN[UTTERANCE_NUMBER]~556

-IF UTTERANCE_NUMBER = 1~558

-PROMPT USER TO REPEAT WHAT JUST SAID

-OTHERWISE~560

-PROMPT USER TO SAY EXPECTED WORD~562

-IF UTTERANCE_NUMBER >2~564

-COMPARE TOKEN[X]s WITH EACH OTHER~566

-IF THREE SCORE WITHIN A GIVEN DISTANCE OF EACH OTHER~568

-LABEL THE THREE CLOSELY SCORING TOKEN[X]s WITH EXPECTED WORD~570

-SET USER_RESPONSE TO EXPECTED WORD~572

-EXIT UTTERANCE_LOOP~574

-ELSE IF UTTERANCE_NUMBER = 5,~576

-LABEL THREE TOKEN[X]s WHICH COMPARE MOST CLOSELY AS EXPECTED WORD~578

-SET USER_RESPONSE TO EXPECTED WORD~580

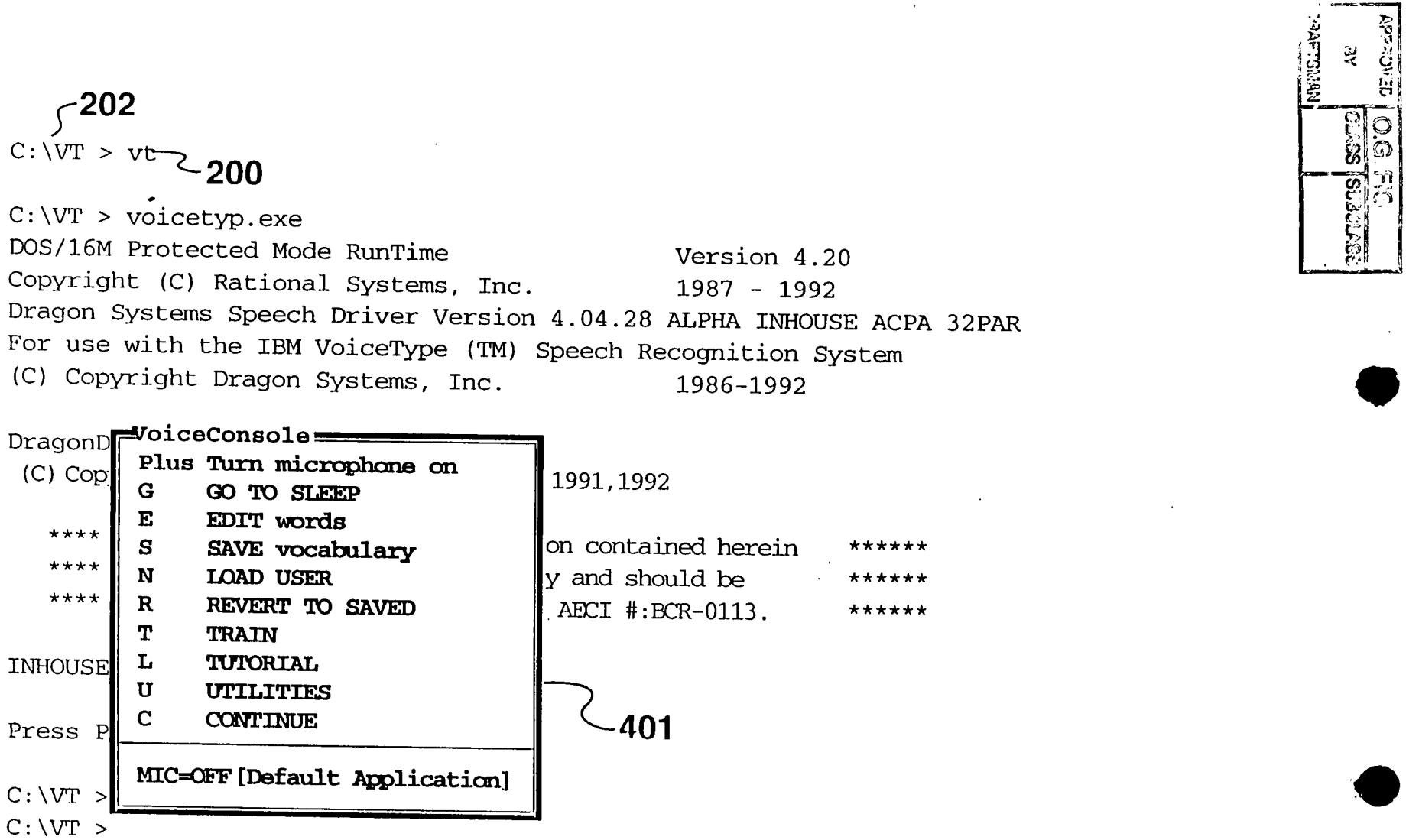
-EXIT UTTERANCE_LOOP~582

-IF USER_RESPONSE IS NOT ZERO~584

-CALL ADAPTIVE TRAINING SUBROUTINE FOR UTTERANCE'S THREE BEST SCORING TOKEN[X]s AND EXPECTED WORD~

-SAVE THREE CLOSEST TOKEN[X]s, LABELED BY THEIR ASSOCIATED EXPECTED WORD~585

FIG. 21B


202
C:\VT > vt
200
C:\VT > voicetyp.exe
DOS/16M Protected Mode RunTime Version 4.20
Copyright (C) Rational Systems, Inc. 1987 - 1992
Dragon Systems Speech Driver Version 4.04.28 ALPHA INHOUSE ACPA 32PAR
For use with the IBM VoiceType (TM) Speech Recognition System
(C) Copyright Dragon Systems, Inc. 1986-1992
DragonD
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1991,1992
****
****
****
on contained herein ******
y and should be ******
AECI #:BCR-0113. ******
INHOUSE
Press P
C:\VT >
C:\VT >
VoiceConsole
Plus Turn microphone on
G GO TO SLEEP
E EDIT words
S SAVE vocabulary
N LOAD USER
R REVERT TO SAVED
T TRAIN
L TUTORIAL
U UTILITIES
C CONTINUE
MIC=OFF [Default Application]
401

Figure 22

```
C:\VT > vt

C:\VT > voicetyp.exe
DOS/16M Protected Mode RunTime                  Version 4.20
Copyright (C) Rational Systems, Inc.            1987 - 1992
Dragon Systems Speech Driver Version 4.04.28 ALPHA INHOUSE ACPA 32PAR
For use with the IBM VoiceType (TM) Speech Recognition System
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   ****                                         information contained herein      ******
   ****                                         roprietary and should be          ******
   ****                                         Agreement AECI #:BCR-0113.        ******

INHOUSE

Press P

C:\VT >
C:\VT >
```

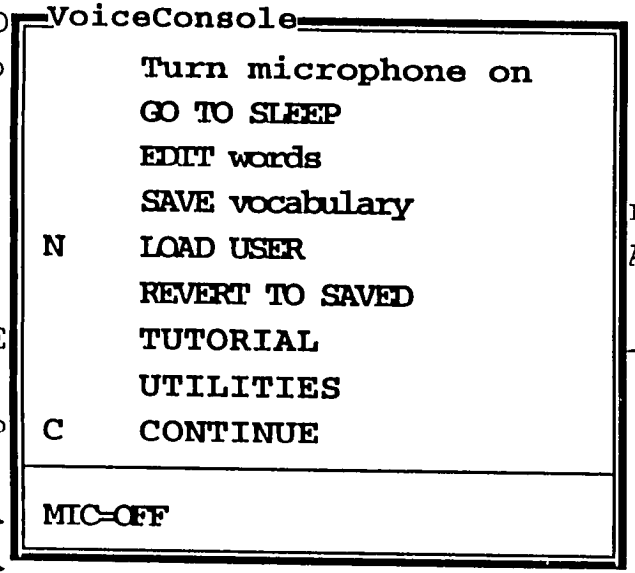

401A

Figure 23

```
C:\VT > vt
C:\VT > voicetyp.exe
DOS/16M Protected Mode RunTime                Version 4.20
Copyright (C) Rational Systems, Inc.          1987 - 1992
Dragon Systems Speech Driver Version 4.04.28 ALPHA INHOUSE ACPA 32PAR
For use with the IBM VoiceType (TM) Speech Recognition System
(C) Copyright Dragon Systems, Inc.            1986-1992

DragonDictate 100K Version 1.40.00
 (C) Copyright Dragon Systems, Inc. 1990,1991,1992

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   ****    is Confidential and Proprietary and should be          *****
   ****    treated as such. SEE Agreement AECI #:BCR-0113.        *****

INHOUSE VERSION

Press Plus for menu
```

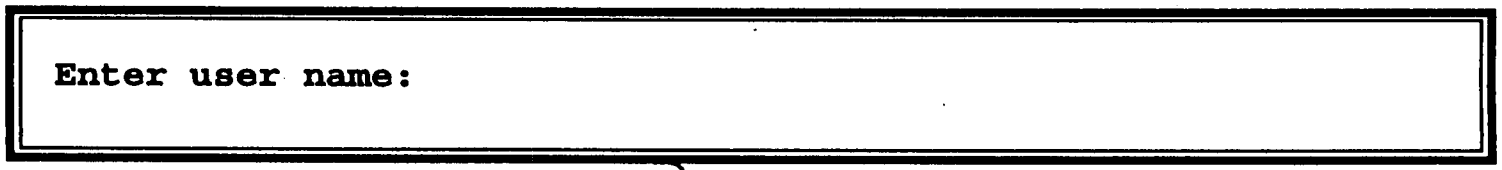


```
C:\VT >
C:\VT >
```

Figure 24

```
C:\VT > vt

C:\VT > voicetyp.exe
DOS/16M Protected Mode RunTime                  Version 4.20
Copyright (C) Rational Systems, Inc.            1987 - 1992
Dragon Systems Speech Driver Version 4.04.28 ALPHA INHOUSE ACPA 32PAR
For use with the IBM VoiceType (TM) Speech Recognition System
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DragonDictate 100K Version 1.40.00
 (C) Copyright Dragon Systems, Inc. 1990,1991,1992

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   ****    is Confidential and Proprietary and should be          ******
   ****    treated as such. SEE Agreement AECI #:BCR-0113.        ******

INHOUSE VERSION

Press Plus for menu
```

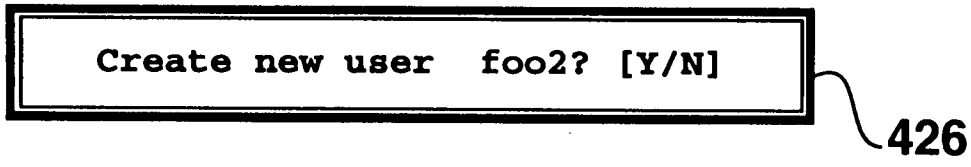


```
C:\VT >
C:\VT >
```

Figure 25

```
C:\VT > vt

C:\VT > voicetyp.exe
DOS/16M Protected Mode RunTime                  Version 4.20
Copyright (C) Rational Systems, Inc.            1987 - 1992
Dragon Systems Speech Driver Version 4.04.28 ALPHA INHOUSE ACPA 32PAR
For use with the IBM VoiceType (TM) Speech Recognition System
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    ****                                                  *****
    ****                                                  *****
    ****                                                  *****

INHOUSE

Press P

C:\VT >
C:\VT >
```

IMPORTANT!

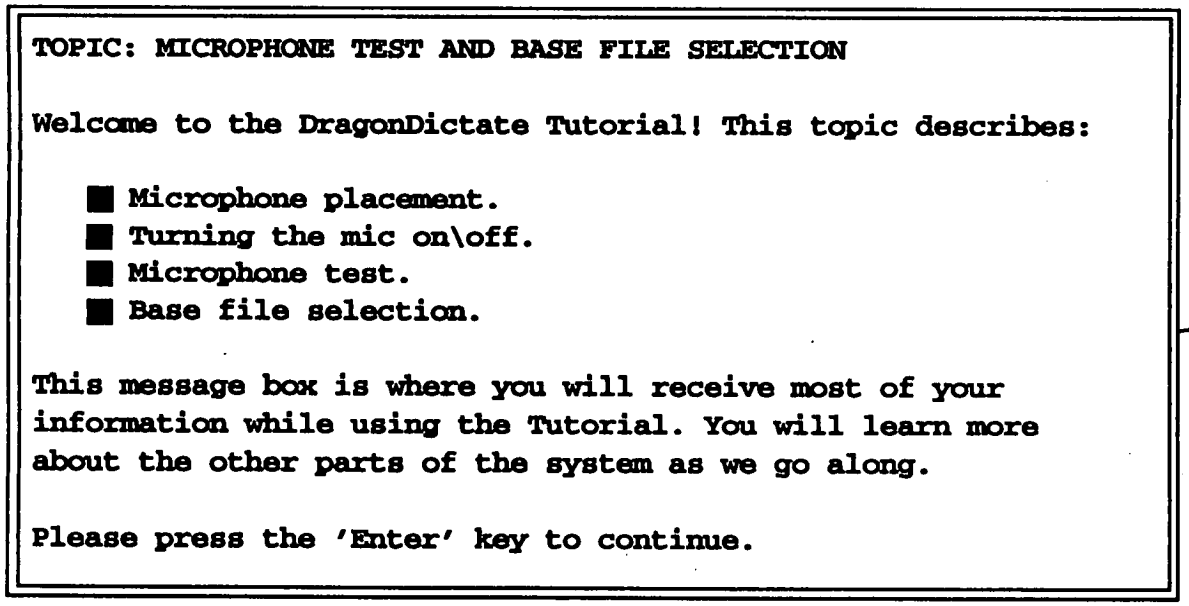
As a NEW USER, it is very IMPORTANT to run the tutorial. This will teach you how to operate DragonDictate correctly and allow the system to adapt to your voice more quickly.

This will greatly improve the accuracy of your dictation, and allow you to use the system more easily.

Would you like to run the tutorial? Y/N

436

Figure 26



F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 1 Ln 6

Figure 27

471

```
GetValidEvent( mask=1 )
        Globals:
                TIMEOUT 40 (moff) (noclr) --> CALL global-mic-off
472             ANYKEY (moff) (noclr) --> CALL global-mic-off
                ANYKEY (norm) (nxpg) (moff) (noclr) --> CALL global-unknown-key
                KEY 'Enter' (norm) (nxpg) (moff) (noclr) --> CALL global-key-not-now
                KEY 'KeyPadEnter' (norm) (nxpg) (moff) (noclr) --> CALL global-key-not-now
                ANYSPELLKEY (norm) (nxpg) (moff) (noclr) --> CALL global-key-not-now
                KEY '+' (norm) (nxpg) (moff) (noclr) --> CALL global-wrong-plus-key
                KEY '-' (norm) (nxpg) (moff) (noclr) --> CALL global-wrong-minus-key
                TIMEOUT 40 (norm) (nxpg) (noclr) --> CALL global-timeout
                KEY 'F1' (norm) (nxpg) (moff) (noclr) --> CALL global-get-help
                UTT "[get help]" (norm) (nxpg) (noclr) --> CALL global-get-help
                UTT_TOO_LOUD (norm) (nxpg) (moff) (noclr) --> CALL global-too-loud
                UTT_TOO_SOFT (norm) (nxpg) (moff) (noclr) --> CALL global-too-soft
                REJECTED_UTT (norm) (nxpg) (moff) (noclr) --> CALL global-rejected-utt
                UTT_STRANGE (norm) (nxpg) (moff) (noclr) --> CALL global-rejected-utt
                TALK_TOO_FAST (norm) (nxpg) (moff) (noclr) --> CALL global-talk-too-fast
                UTT_TOO_LONG (norm) (nxpg) (moff) (noclr) --> CALL global-utt-too-long
                KEY 'Esc' (norm) (nxpg) (moff) (noclr) --> CALL global-escape
                KEY 'Minus' (norm) (nxpg) (moff) (svmsg) --> CALL global-mainmenu
                UTT "[Tutor menu]" (norm) (nxpg) (svmsg) --> CALL global-mainmenu
                KEY 'Plus' (norm) (nxpg) (moff) (svmsg) --> CALL global-voice-console
                UTT "[voice console]" (norm) (nxpg) (svmsg) --> CALL global-voice-console
        Defaults:
                LASTWORD "[new paragraph]" (norm) (noclr) --> CALL default-lastword
474             NEXTWORD ", "comma"" (norm) (noclr) --> CALL default-nextword
                LASTWORD "[new paragraph]" (nxpg) (noclr) --> CALL default-nextpage
                CURWORD "down" (nxpg) (noclr) --> CALL default-nextpage
                NEXTWORD ", "comma"" (nxpg) (noclr) --> CALL default-nextpage
                KEY 'F2' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F3' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F4' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F5' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F6' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F7' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F8' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F9' (norm) (noclr) --> CALL default-no-function-keys
                KEY 'F10' (norm) (noclr) --> CALL default-no-function-keys
                UTT "[oops!]" (norm) --> CALL d3gd-oops
        Cases:
476             UTT "down" (norm) --> *e
                UTT "[choose 1 ]" (norm)  --> GOTO d2gd-said-okay
                UTT "[OKAY]" (norm)  --> GOTO d2gd-said-okay
                KEY 'Backspace' (norm)  --> CALL d2gd-ignore-backspace
477             LASTSPELLKEY '[' (norm)  --> CALL d2gd-one-right
                ANYSPELLKEY (norm)  --> CALL d2gd-one-wrong
        Ceiling:
End of Stack.
```

FIG. 28

DragonDictate Tutorial - Main Menu		
Esc	"continue"	to clear this menu and continue running the Tutorial
F1	"[get help]	for more information on using the tutorial menu
F2	"quit"	to exit the tutorial (option saving your place)
F3	"reset"	to revert-to-saved and restart the current topic
Or select one of the following topics: (asterisk means completed)		
A	"alpha"	Base File Selection
B	"bravo"	Introduction to the Tutorial
C	"charlie"	How DragonDictate Works
D	"delta"	The Voice Console and Disabling the Microphone
E	"echo"	Learning to Dictate
F	"foxtrot"	Basic Punctuation
G	"golf"	Saving Your Vocabulary Files
H	"hotel"	Correcting Dictation with the Choice List
I	"india"	Deleting Utterances with [choose 10]
J	"juliett"	Spelling Words Not on Choice List
K	"kilo"	The Dictionary and Adding New Words
L	"lima"	Correcting Old Errors with the Oops Buffer
M	"mike"	Dictating Dates, Numbers, and Addresses
Say "[next page]" to see more topics		

Figure 29

```
502 ********************************************************************
    ** MODULE NAME: final7.pln
    ** Copyright (c) Dragon Systems,Inc. 1992
    ** OWNER:       Joel Gould
    ** CREATED:     September 4, 1992
    ** FUNCTIONS
    ** DESCRIPTION
    ** Chapter 7
    ** This topic teaches the user to correct dictation errors by
    ** selecting words from the choice list.
    ********************************************************************
    ** MODIFICATIONS
    ** ...
    **
    ********************************************************************
504 CHAPTER Correcting Dictation with the Choice List

    DEFAULT NOCLEAR LASTWORD      CALL default-lastword
    DEFAULT NOCLEAR NEXTWORD      CALL default-nextword
    DEFAULT NEXTPAGE NOCLEAR LASTWORD   CALL default-nextpage
    DEFAULT NEXTPAGE NOCLEAR CURWORD    CALL default-nextpage
    DEFAULT NEXTPAGE NOCLEAR NEXTWORD   CALL default-nextpage
    DEFAULT NOCLEAR 'F2'                CALL default-no-function-keys
    DEFAULT NOCLEAR 'F3'                CALL default-no-function-keys
506 DEFAULT NOCLEAR 'F4'                CALL default-no-function-keys
    DEFAULT NOCLEAR 'F5'                CALL default-no-function-keys
    DEFAULT NOCLEAR 'F6'                CALL default-no-function-keys
    DEFAULT NOCLEAR 'F7'                CALL default-no-function-keys
    DEFAULT NOCLEAR 'F8'                CALL default-no-function-keys
    DEFAULT NOCLEAR 'F9'                CALL default-no-function-keys
    DEFAULT NOCLEAR 'F10'               CALL default-no-function-keys
    DEFAULT NOCLEAR ANYSPELLKEY         CALL default-no-spelling-keys

    * IF INORDER GOTO chap7-start

508 EDITOR RESET

    * LESSON chap7-start

510 CONSOLE MIC ON
    CONSOLE SLEEP OFF
512 PROMPT HIDE
514 EDITOR SHOW
    *--------------------------------------------------------------------
    `{HIGH}TOPIC: CORRECTING DICTATION WITH THE CHOICE LIST{NORM}
    `
    `This topic describes how to use the choice list to correct dictation
    `errors. You are going to learn how to:
    `
516 ` \p Accept {NAMENORM}'s default choice
    `
    ` \p Choose another word from the choice list
```

FIG. 30A

```
      `
      `Please say {SAY}"[okay]" to continue.{CR}
      `Please say {UTT}"[Tutor menu]" to display the menu.

518   EXPECTING "[okay]"

      IF INORDER CALL chap7-bonus-text

590   PROMPT RESET
      PROMPT SHOW
      PROMPT HIGHLIGHT OFF
      *
      *

      * PROMPT /when/suddenly/a/white/rabbit/with/pink/eyes/
      * PROMPT /ran/close/by/her/. \"period\"/
      PROMPT /[new paragraph]/
      PROMPT /there/was/nothing/so/very/remarkable/in/that/; \"semicolon\"/
      PROMPT /nor/did/Alice/think/it/so/very/much/out/of/the/way/to/
      PROMPT /hear/the/rabbit/say/to/itself/, \"comma\"/" \"open quote\"/
      PROMPT /oh/dear/! \"exclamation point\"/oh/dear/! \"exclamation point\"/
592   PROMPT /I/shall/be/too/late/! \"exclamation point\"/" \"close quote\"/
      PROMPT /( \"open paren\"/when/she/thought/it/over/afterwards/, \"comma\"/
      PROMPT /it/occurred/to/her/that/she/ought/to/have/wondered/at/this/,
      \"comma\"/
      PROMPT /but/at/the/time/it/all/seemed/quite/natural/) \"close paren\"/;
      \"semicolon\"/

596   PROMPT HIGHLIGHT ON

598   `Since you are starting a new topic, please start a new paragraph
      `in your document. Say {SAY}"[new paragraph]".

602   EXPECTING "[new paragraph]"
604   CHOICELIST 1="[new paragraph]"

606   `Please begin dictating this lesson by saying the first word in the
      `Text Prompter, {SAY}"there".

610   EXPECTING "there"
612   CHOICELIST 1="there"

      `This is a choice list, which has appeared every time you've dictated a
      word.
      `
616   `If the word you said is correctly identified, it is listed first on the
      `choice list. However, you still have to tell {NAMENORM} that this
      `recognition is correct.
      `
      `There are three ways to do this.

620   NEWPAGE

622   `The first is to say the next word. This
```

FIG. 30B

```
622 `is the method you used in the previous topic.
    `
    `The second way is to say {UIT}"[okay]". You used this method in earlier
    `topics.
    `
    `The third way is to say {UIT}"[choose 1]", since you want to choose
    `the first word on the choice list.

626 NEWPAGE

    `Until now, the word the Text Prompter asked you to dictate has always
    `appeared as the first word on the choice list. But that doesn't always happen
    `when you dictate in {NAMENORM}.
    `
630 `Sometimes the word you dictate will be an alternate choice on the list.
    `
    `Sometimes it won't be on the list at all.
    `
    `Please continue dictating from the Text Prompter, starting with
    `{SAY}"was".

636 EXPECTING "was"
    *-------------------------------------------------------------------
638 call dictate1-no-error   * next: "nothing"
640 call dictate1-no-error   * next: "so"

    `Sometimes {NAMENORM} identifies the word said as a possibility, but
    `not as the most likely choice. When this happens, the word will appear
652 `on the choice list, but not as the first choice.
    `
    `Please dictate the next word.

656 call dictate1-no-error   * next: "very"
    *-------------------------------------------------------------------
660 CHOICELIST 1="vary" 3="very"
666 POINTAT CHOICELIST 3

    `Although you said {UIT}"very", {NAMENORM} thought
    `that the most likely thing that you said was {UIT}"vary".
    `
668 `{NAMENORM} learns from its mistakes and adapts to your style of speech.
    `Therefore, you must correct any recognition errors immediately.

    NEWPAGE

    `If you fail to correct {NAMENORM}'s mistake in this case, every time you say
    `{UIT}"very", it will type {UIT}"vary". If this mistake goes by undetected,
    `other words are also affected.
672 `The next time you say {UIT}"merry", {NAMENORM} may think you mean
    `{UIT}"marry".

    NEWPAGE
```

FIG. 30C

```
676 `If, as in this case, the word you spoke is not in the first position
    `on the choice list, you must tell {NAMENORM} which word you actually
    `spoke. You do this with the {UTT}"[choose n]" command, where {UTT}"n" re
    `the number of the word on the choice list.

    NEWPAGE

680 `In this case, you want {NAMENORM} to select the third word.
    `
    `Please say {SAY}"[choose 3]" now.

684 CASE {NEXTWORD} CALL must-say-choose-n
686 EXPECTING "[choose 3]"
    *-----------------------------------------------------------------------

688 CHOOSE 3

692 `Saying {UTT}"[choose 3]" made {NAMENORM} erase the word {UTT}"vary"
    `from the text and type the word {UTT}"very" instead.
    `
    `Because you chose the word you spoke, {NAMENORM} no
    `longer needs to show a list of possible interpretations of the utterance,
    `and it has removed the choice list from the screen.
    `
    `As soon as you say the next word, the choice list will re-appear with a
    `new set of possibilities.

    NEWPAGE

696 `For the rest of this tutorial, the {NAMENORM} Tutorial will allow
    `random recognition errors
    `to occur while you practice your dictation.  Correct them as soon as
    `they happen, to prevent corruption
    `of your vocabulary.
    `
    `If {NAMENORM} correctly identifies the word you say, continue on to
    `the next word.  If it incorrectly identifies the word you say, correct it
    `by saying {UTT}"[choose n]", where {UTT}"n" is the number of the desired
    `word on the choice list. If you don't correct your errors, the Tutorial
    `will remind you.
    `
    `To start dictating again, please say the next word on your
    `Text Prompter, {SAY}"remarkable".

700 EXPECTING "remarkable"
    *-----------------------------------------------------------------------

702 call dictate1-no-error                  * next: "in"
708 call dictate1-no-error                  * next: "that"

714 CHOICELIST 1={CURWORD}

720 `Please say {SAY}"; \"semicolon\"".
```

FIG. 30D

```
724 CASE "[choose 1]" CALL dlgd-said-okay
    CASE "[okay]" CALL dlgd-said-okay
726 EXPECTING "; \"semicolon\""

728 call dictate1-no-error                * next: "nor"
    *-------------------------------------------------------------------
    *must-correct-errors

734 `Notice that the word "nor" did not appear first on
    `your choice list. Please choose the correct word now,
    `and then continue dictating.

    *-------------------------------------------------------------------
738 CALL dictate1-on-list                 * next: "did"

    CHOICELIST 1={CURWORD}
762 CASE "[choose 1]" CALL dlgd-said-okay
    CASE "[okay]" CALL dlgd-said-okay
    EXPECTING "Alice"
    *-------------------------------------------------------------------
    *                                          expecting:
    *                                          ----------
766 CALL dictate1-no-error                * think
768 CALL dictate1-no-error                * it
770 CALL dictate1-on-list                 * so
    CALL dictate1-no-error                * very
    CALL dictate1-no-error                * much
    CALL dictate1-on-list                 * out
    CALL dictate1-on-list                 * of
    CALL dictate1-no-error                * the
    CALL dictate1-no-error                * way
    CALL dictate1-no-error                * to
    CALL dictate1-no-error                * hear
    CALL dictate1-no-error                * the
    CALL dictate1-on-list                 * rabbit
    CALL dictate1-no-error                * say
    CALL dictate1-no-error                * to
    CALL dictate1-on-list                 * itself
    CALL dictate1-no-error                * , \"comma\"
    CALL twoword1-open-quote              * " \"open quote\"
                                          * oh
    CALL dictate1-no-error                * dear

    `{NAMENORM} has two words for the {UTT}'!' character:
    `{UTT}"! \"exclamation point\"" and
    `{UTT}"! \"exclamation mark\"".
    `
    `While you use the {NAMENORM} Tutorial, however,
    `only {UTT}"! \"exclamation point\"" is active.
    `
```

FIG. 30E

```
*************************************************************************
** MODULE NAME: dictate.pln
** Copyright (c) Dragon Systems,Inc. 1992
** AUTHOR:      Joel Gould
** CREATED:     Sept 17, 1992
** FUNCTIONS
** DESCRIPTION
** {NAMESHORT} Trainer lesson plan component
** -Originally part of global.pln, this file contains the lesson plan
** code which handles dictation practice
** ...
*************************************************************************
** ...
*************************************************************************
*
* DICTATION PRACTICE SUBROUTINE - 1
*
* Includes support for
*     - choose words
*
* Each subroutine should be called for one word in the teleprompter.
* Just before calling the subroutine should be an EXPECTING command
* for the word in question.  Each subroutine will end with an EXPECTING
* command and return only if the next word in the teleprompter was
* spoken.
*
* For example:
*
* PROMPT /one/two/three/four/
* EXPECTING "one"
* CALL dictate1-no-error    * one is 1st on choice list; expecting two
* CALL dictate1-no-error    * two is 1st on choice list; expecting three
* CALL dictate1-on-list     * three is put in random slot on choice list
*                      *       upon exit we will be expecting four
* CHOICELIST 1="four"
*
*************************************************************************
*
* ---> DICTATE1-RANDOM
*
* Currently forces an on-list error if we just had a misrecognition.
* Also introduces errors 5% of the time (just to be sure we get one)
*
LESSON dictate1-random
IF SHORTWORD GOTO dictate1-no-error
RANDOMIZE 50 dictate1-no-error
IF MISRECOG  GOTO dictate1-on-list
RANDOMIZE  5 dictate1-on-list
GOTO dictate1-no-error
*-----------------------------------------------------------------------
*************************************************************************
```

FIG. 31A

```
        *
        * ---> DICTATE1-NO-ERROR
        *
        * Put current word first on choice list, then get the next word
        *
640     LESSON dictate1-no-error
640A    CHOICELIST 1={CURWORD}
640B    LESSON dictate1-no-error-after
640C    HIGHLIGHT NEXTWORD                  * LASTWORD <- CURWORD
640D    CASE "[okay]"           GOTO d1gd-said-okay
640E    CASE "[choose 1]" GOTO d1gd-said-okay
640F    EXPECTING {CURWORD}
640G    RETURN
        *-------------------------------------------------------------------------
        * We end up here if the user has said OKAY or something else which
        * accepts the last word and clears the choice list.  Here we expect
        * him, to say the next word.
        *
646     LESSON d1gd-said-okay
646A    CHOOSE {LASTWORD}
646B    EXPECTING {CURWORD}
646C    RETURN
        *-------------------------------------------------------------------------


        ************************************************************************
        *
        * ---> DICTATE1-ON-LIST
        *
        * Pick a random slot for the word to appear which is not the first
        * slot on the choice list.  Make sure the user says "choose-N",
        * then get the next word
        *
740     LESSON dictate1-on-list
740A    CHOICELIST ?={CURWORD}
740B    HIGHLIGHT NEXTWORD                  * LASTWORD <- CURWORD
740C    CASE {CURWORD}      CALL d1on-say-choose-n
740D    CASE "[okay]"       CALL d1on-say-choose-n
740E    CASE "[choose 1]" CALL d1on-say-choose-n
740F    EXPECTING "[choose {?}]"
740G    CHOOSE {?}
740H    EXPECTING {CURWORD}
740I    RETURN
        *-------------------------------------------------------------------------
746     LESSON d1on-say-choose-n
746A    AFTERSEEN 1 d1on-short1-say-choose-n

        `The performance of {NAMESHORT} improves with every error it makes,
        `but only if you correct the mis-recognitions.  If you do not correct
746B    `every error, {NAMESHORT}'s performance will get worse.
        `
        `{NAMESHORT} has incorrectly identified the word you just spoke.
```

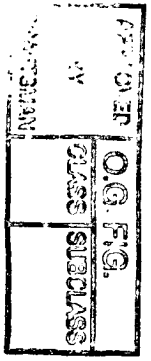
FIG. 31B

```
`
`The correct word {UTT}{LASTWORD} is on the choice list, however,
`and you can correct {NAMESHORT}'s mis-recognition. Please {WHAT2DO}.

746D REMOVEUTT
746E RETURN REPEAT
     *-------------------------------------------------------------------------
748  LESSON dlon-short1-say-choose-n
748A RANDOMIZE 25 dlon-short2-say-choose-n
748B RANDOMIZE 33 dlon-short3-say-choose-n
748C RANDOMIZE 50 dlon-short4-say-choose-n

748D `Please correct {NAMESHORT}'s mis-recognition before continuing.
     `Please {WHAT2DO}.

748E REMOVEUTT
748F RETURN REPEAT
     *-------------------------------------------------------------------------
750  LESSON dlon-short2-say-choose-n

     `Please {WHAT2DO} to correct that last mis-recognition.

     REMOVEUTT
     RETURN REPEAT
     *-------------------------------------------------------------------------
752  LESSON dlon-short3-say-choose-n

     `It is very important to correct all mis-recognitions to
     `prevent your vocabulary files from being corrupted.
     `Please say {SAY}{EXPECTED}.

     REMOVEUTT
     RETURN REPEAT
     *-------------------------------------------------------------------------
754  LESSON dlon-short4-say-choose-n

     `Correct the last error before continuing to dictate.

     REMOVEUTT
     RETURN REPEAT
     *-------------------------------------------------------------------------
```

FIG. 31C

```
        * ---> DICTATE3-RANDOM
        *
        * Currently forces an on-list error if we just had a misrecognition.
        * Also introduces errors 5% of the time (just to be sure we get one)
        *
        * When an error is indicated, we choose on-list 60% of the time and
        * off-list 40% of the time.
        *
779     LESSON dictate3-random
779A    IF SHORTWORD GOTO dictate3-no-error
779B    RANDOMIZE 50 dictate3-no-error
779C    IF MISRECOG  GOTO d3-error
779D    RANDOMIZE 5  d3-error
779E    GOTO dictate3-no-error
        *-------------------------------------------------------------------------
779F    LESSON d3-error
779G    RANDOMIZE 60 dictate3-on-list
779H    GOTO dictate3-off-list
        *-------------------------------------------------------------------------
```

FIG. 31D



TOPIC: CORRECTING DICTATION WITH THE CHOICE LIST

This topic describes how to use the choice list to correct dictation errors. You are going to learn how to:

- Accept DragonDictate's default choice
- Choose another word from the choice list

Please say "[okay]" to continue.
Please say "[Tutor menu]" to display the menu.

F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 32

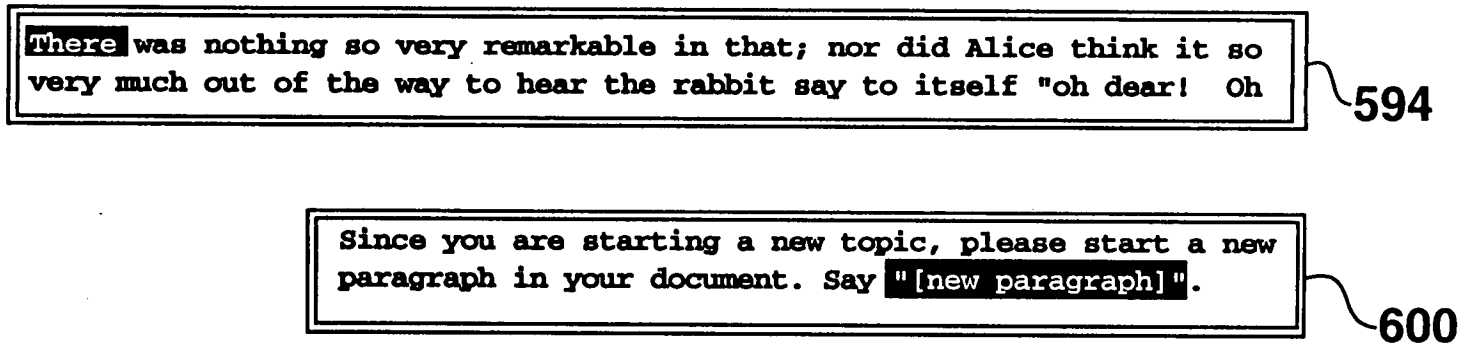
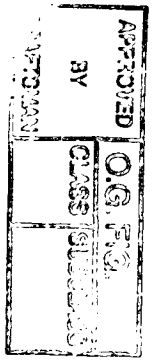


Figure 33



There was nothing so very remarkable in that; nor did Alice think it so very much out of the way to hear the rabbit say to itself "oh dear! Oh

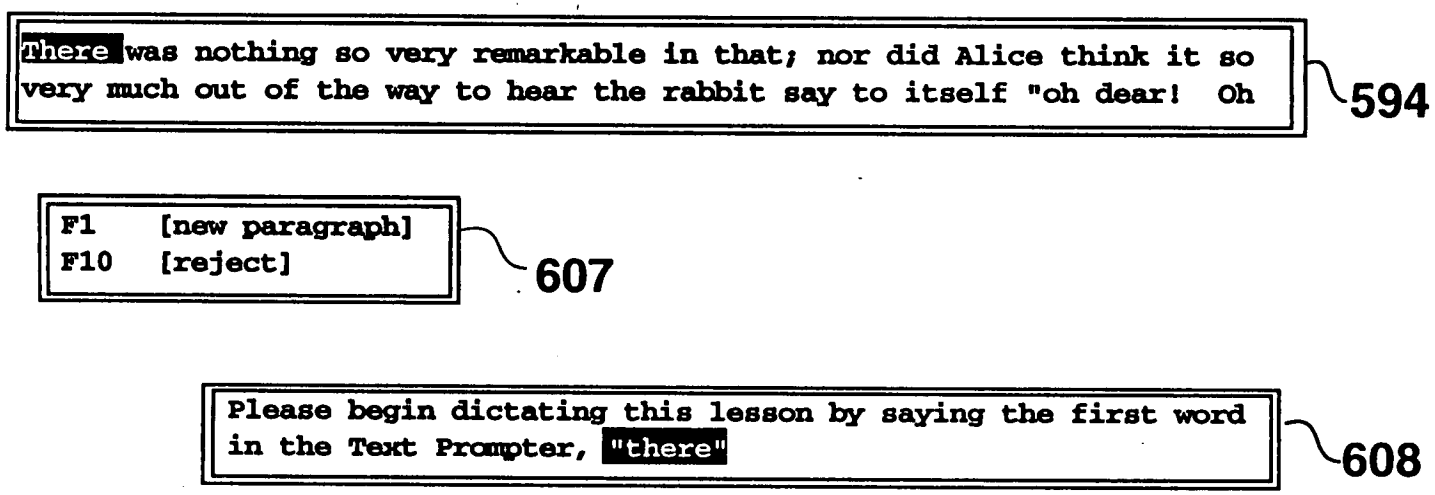
594

Since you are starting a new topic, please start a new paragraph in your document. Say "[new paragraph]".

600

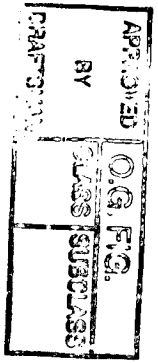
F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

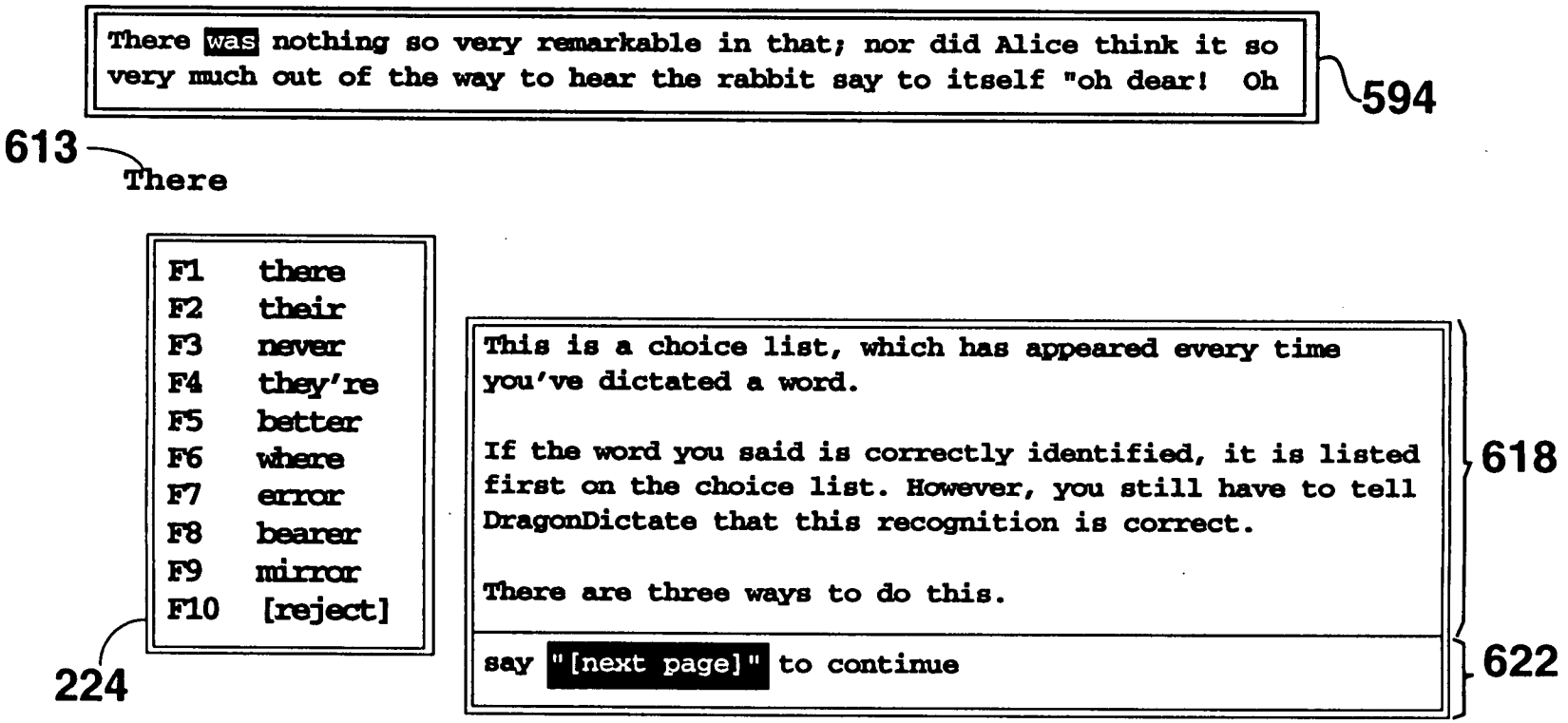
Figure 34



F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

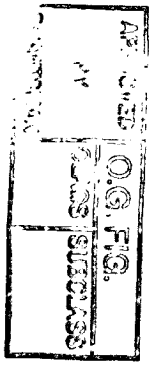
Figure 35

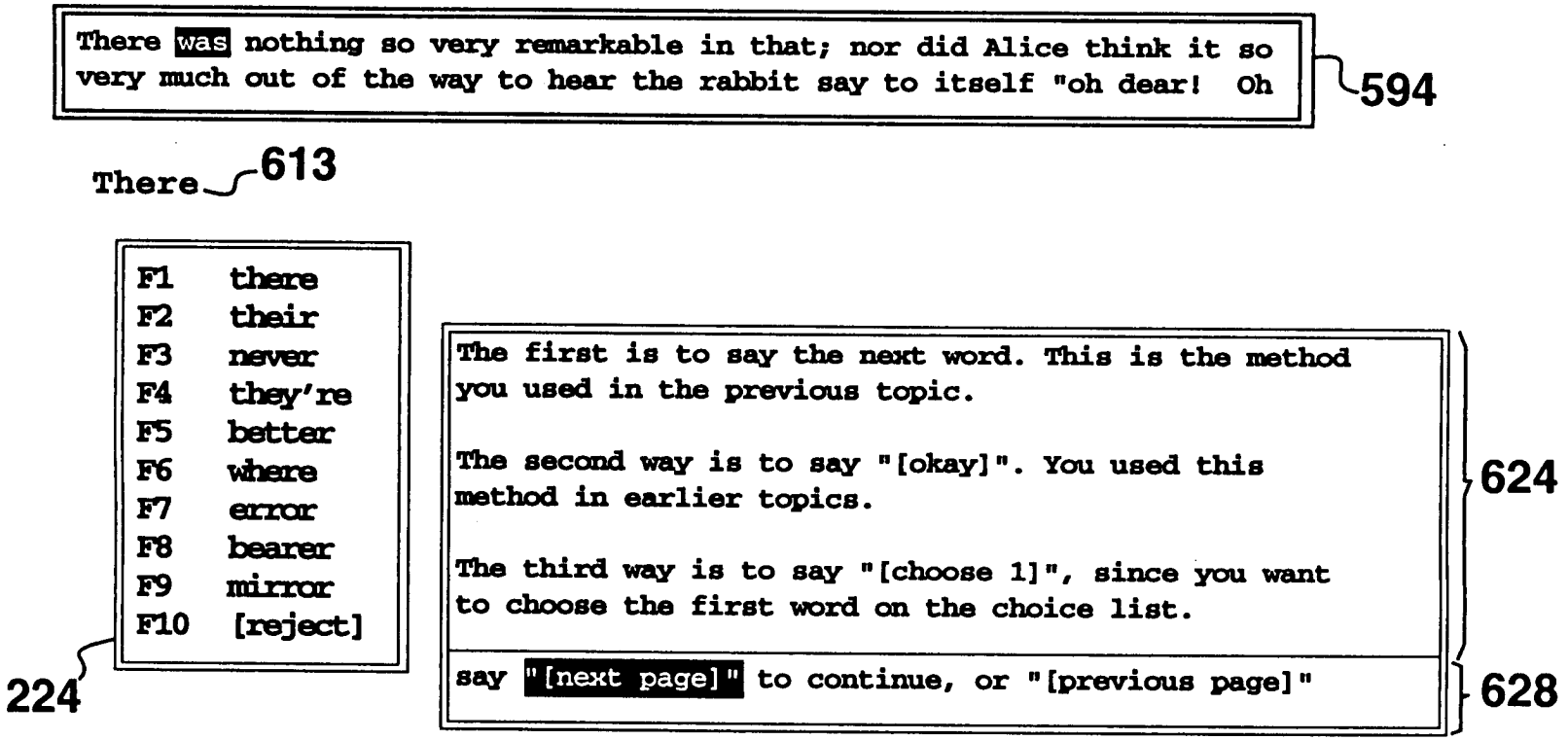




F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 36





F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 37

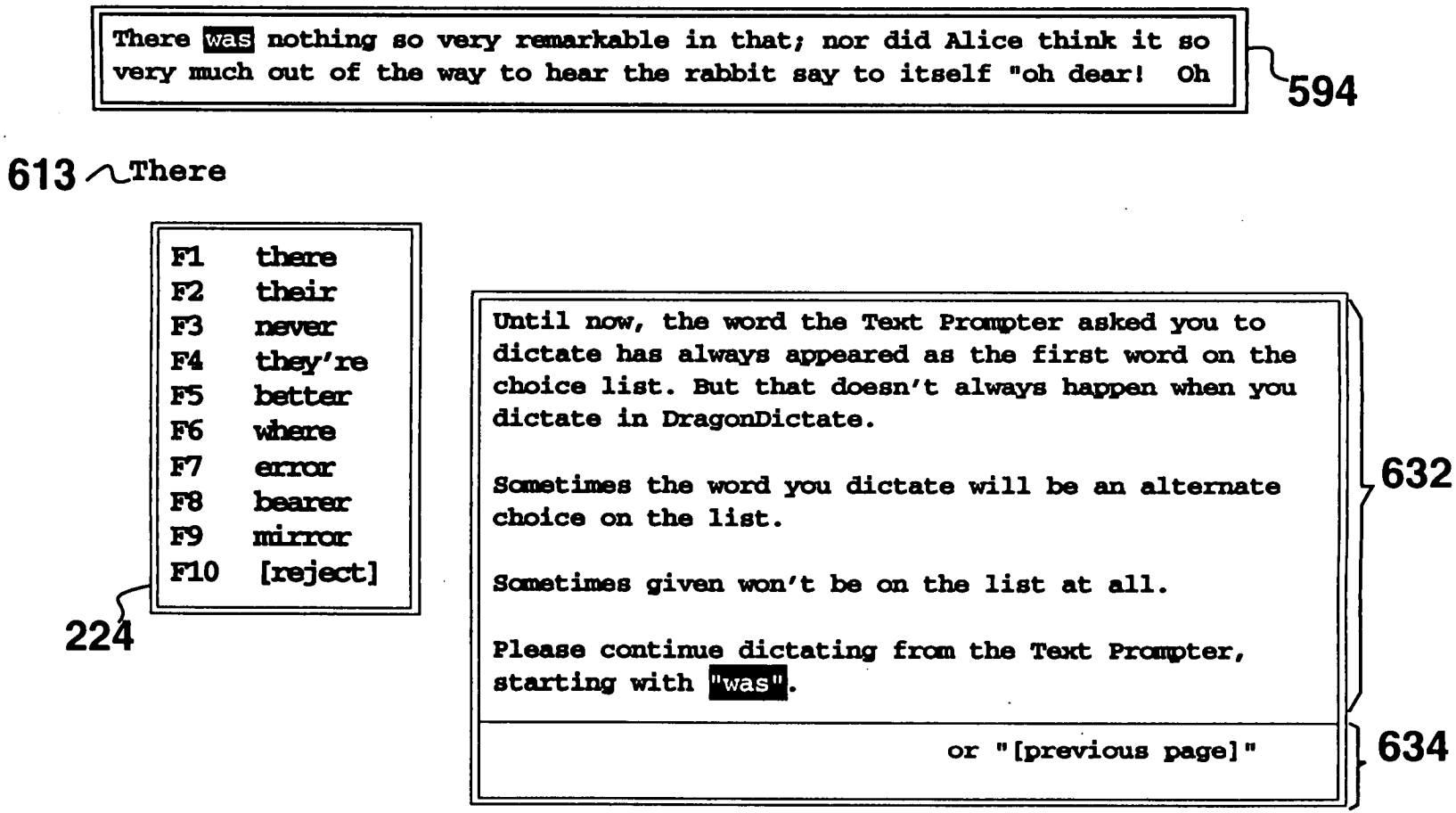
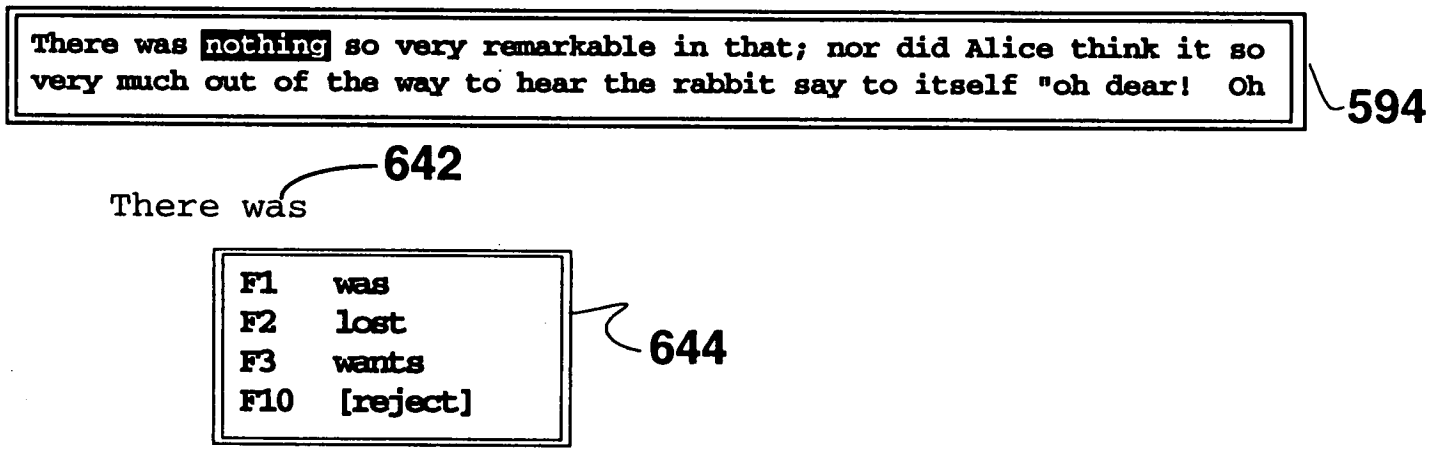


Figure 38



F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 39

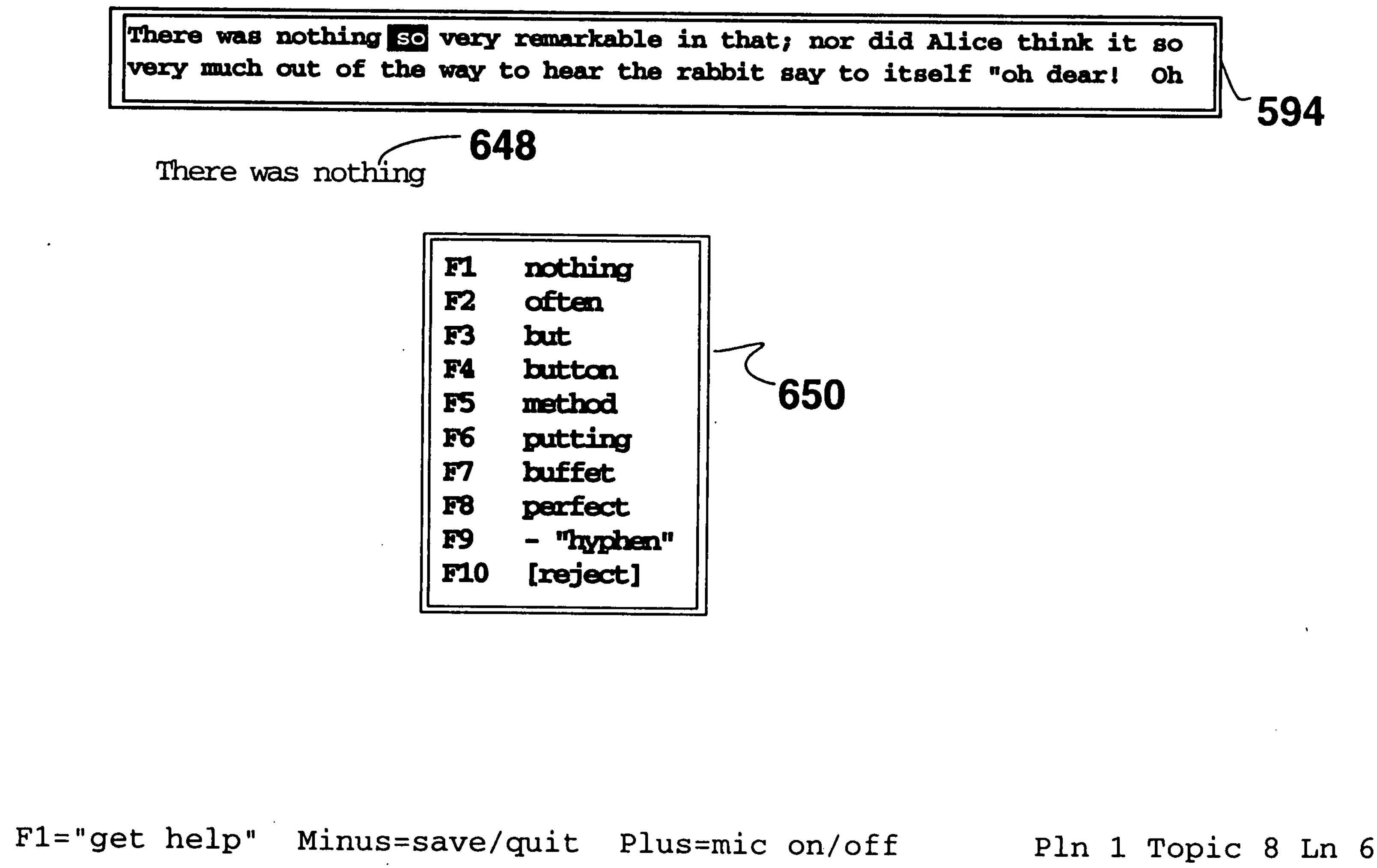
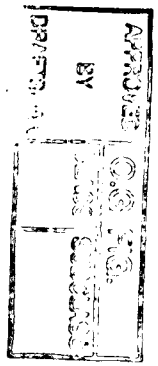

There was nothing so very remarkable in that; nor did Alice think it so
very much out of the way to hear the rabbit say to itself "oh dear! Oh
594
There was nothing
648
F1 nothing
F2 often
F3 but
F4 button
F5 method
F6 putting
F7 buffet
F8 perfect
F9 - "hyphen"
F10 [reject]
650
F1="get help" Minus=save/quit Plus=mic on/off
Pln 1 Topic 8 Ln 6

Figure 40



There was nothing so very remarkable in that; nor did Alice think it so very much out of the way to hear the rabbit say to itself "oh dear! Oh

594

There was nothing so 650

658

F1 nothing
F2 often
F3 but
F4 button
F5 method
F6 putting
F7 buffet
F8 perfect
F9 - "hyphen"
F10 [reject]

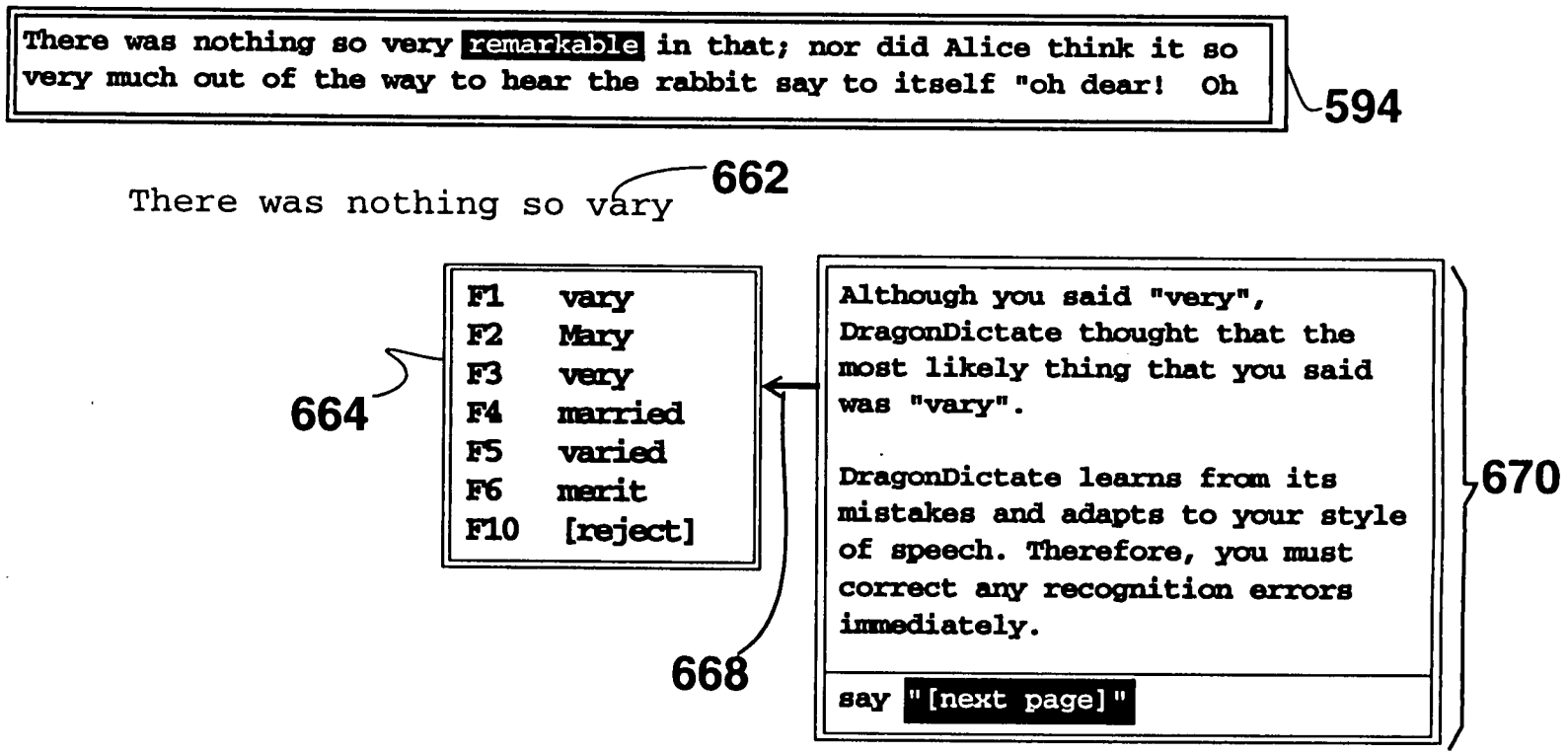
Sometimes DragonDictate identifies the word said as a possibility, but not as the most likely choice. When this happens, the word will appear on the choice list, but not as the first choice.

Please dictate the next word.

654

F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 41



F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 42

There was nothing so very remarkable in that; nor did Alice think it so very much out of the way to hear the rabbit say to itself "oh dear! Oh

594

There was nothing so vary

664

F1 vary
F2 Mary
F3 very
F4 married
F5 varied
F6 merit
F10 [reject]

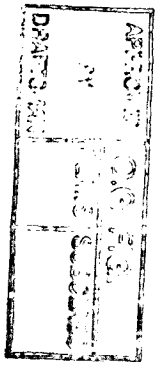
If you fail to correct DragonDictate's mistake in this case, every time you say "very", it will type "vary". If this mistake goes by undetected, other words are also affected. The next time you say "merry", DragonDictate may think you mean "marry".

say "[next page]"

674

F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 43



There was nothing so very remarkable in that; nor did Alice think it so very much out of the way to hear the rabbit say to itself "oh dear! Oh

594

There was nothing so vary

664

F1 vary
F2 Mary
F3 very
F4 married
F5 varied
F6 merit
F10 [reject]

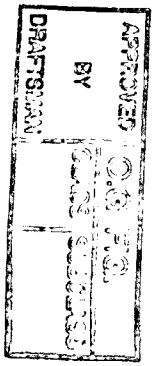
If as in this case, the word you spoke is not in the first position on the choice list, you must tell DragonDictate which word you actually spoke. You do this with the "[choose n]" command, where "n" represents the number of the word on the choice list.

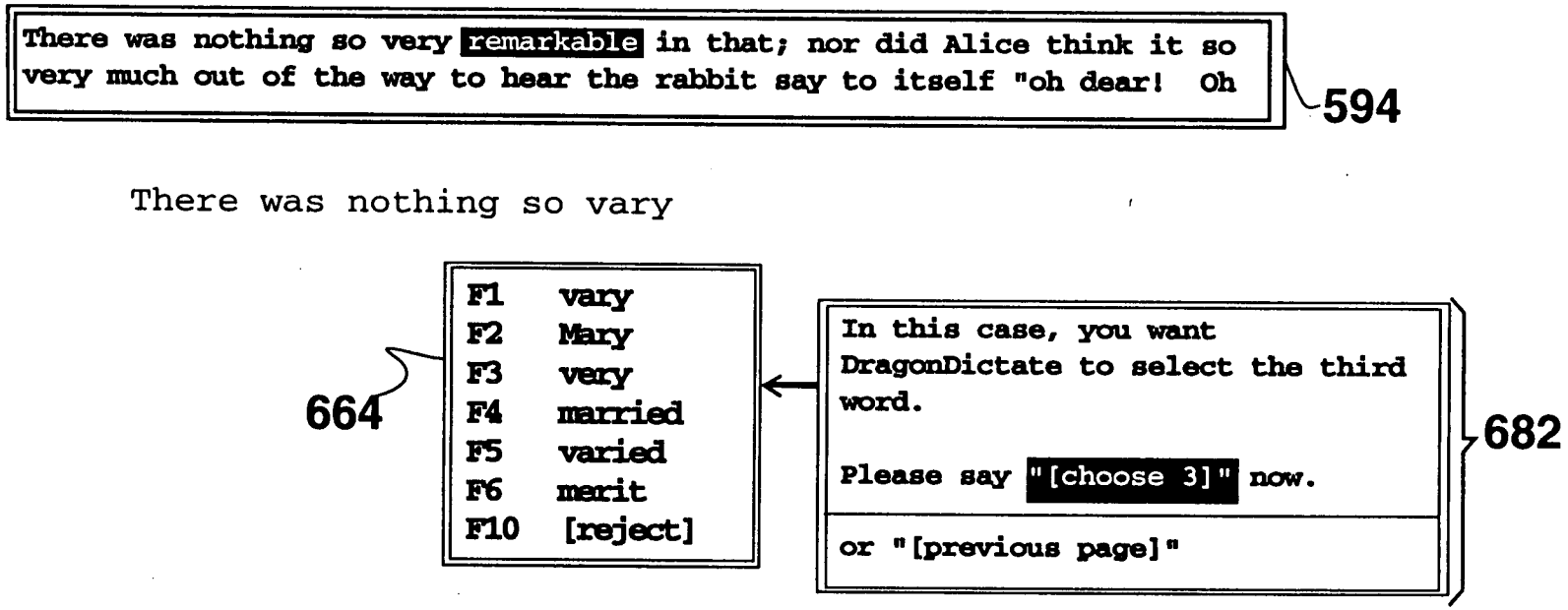
say "[next page]"

678

F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 44





F1="get help" Minus=save/quit Plus=mic on/off Pln 1 Topic 8 Ln 6

Figure 45

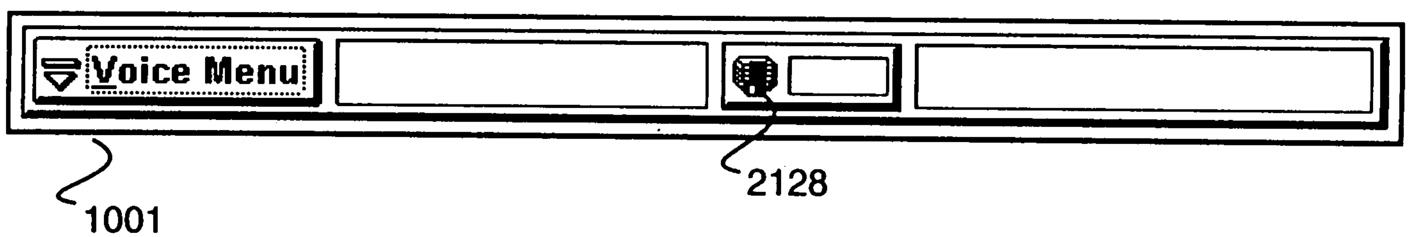


Figure 46

-Initialization()~1002
    -...
    -take start time~1008
    -run integer tasks~1010
    -take end time~1012
    -subtract start time from end time to get task duration~1014
    -set NumberToPassPrefilter and ScoreThreshold in correspondence to task duration~1016
    -...
    -detect if DSP board is present~1018
    -if DSP board is not present, set DSPBoardPresent to false~1020
    -else~1021
        -set DSPBoardPresent to true~1022
        -download DSP code to DSP board~1024
        -initialize DSP board~1026
    -...
    -call MSW SetWindowsHookEx with WH_CALLWNDPROC to set hook for CallWndProc procedure that monitors menu messages~1028
    -call MSW SetWindowsHookEx with WH_KEYBOARD to set hook for KeyboardProc procedure that monitors keystrokes~1030
    -initialize and clear MenuStack~1034
    -initialize and clear HWndToAppTable~1038
    -display the VoiceBar~1042
    -set RecognizerOn to true~1044
    -set ChoiceListOperative to false~1046
    -...

FIG. 47

-DSP board code~1025
    -...
    -every 1/100 second~1050
        -perform utterance detection~1052
        -if detect utterance, notify host~1054
        -...
        -increment OddEvenCount~1056
        -calculate an FFT of the last 1/100 second of audio signal~1058
        -calculate the Cepstrum of the last 1/100 second of audio signal~1060
        -place the FFT and selected Mel Cepstrum values into a frame format~1062
        -if OddEvenCount is even save the just calculated frame~1064
        -if OddEvenCount is odd~1066
            -add the individual values of the just calculated frame to the corresponding values of the frame saved in the previous 1/100 second~1068
            -divide each value in the frame by two~1070
            -send the averaged frame, representing FFT and Mel Cepstrum values for last 1/50 second, to the host processor for addition to the frame buffer~1072
    -...

FIG. 48

-CallWndProc(code, wParam, lParam)~1029
-if message is WM_INITMENU, indicating a menu is about to become active~1664
-clear MenuStack~1666
-place a MenuEntry with the MenuHandle indicated by WM_INITMENU in the MenuStack~1668
-if message is WM_INITMENUPOPUP, indicating a popup menu is about to become active~1670
-if a MenuEntry with the pop-up menu's menu handle in the MenuHandle field is not currently at the end of the MenuStack, add such an entry and place in the preceding entry in the MenuStack the MenuItemID corresponding to the item in the parent menu from which the popup menu came~1672
-if message is WM_MENUSELECT, indicating a user has selected a menu item~1674
-scan the MenuStack for an entry with MenuHandle matching that in the WM_MENUSELECT message~1676
-if find a match~1678
-if find the match other than at the end of the MenuStack, delete the MenuEntries after the matching MenuEntry from the stack~1680
-record the menu item ID returned by WM_MENUSELECT in the MenuItemID field of the MenuEntry with the matching MenuHandle~1682
-else use calls to MSW GetSubMenu to do a tree search, starting with menu handle returned by GetMenu, until find the menu with selected item, and then reestablish the MenuStack with the path in the menu tree which leads to menu of the selected item.~1684
-if message is WM_NCDESTROY, indicating a window is being closed~1686
-if WM_NCDESTROY is being sent to a window having a handle in the HWndToAppTable, delete that handle's entry in table~1688
-if message is WM_ACTIVATE, indicating a window is being activated~1690
-call ApplicationTracking with the window's HWnd~1692
-pop-up any key alteration windows, if any, appropriate for the new active window~1693
-if message is WM_CREATE, indicating a window is being created~1694
-if the new window's handle is already in HWndToAppTable, delete the handle's entry in table~1696
-if message is WM_SHOWWINDOW, indicating a window that was previously covered is being uncovered~1698
-if a call to MSW GetWindow with GW_OWNER for the window indicates it is a application window or a dialog window, call ApplicationTracking with the window's HWnd~1700
-return~1702

FIG. 49

-KeyboardProc(code, wParam, lParam)~1032
    -...
    -if ChoiceListOperative is true and the last message group header before the read pointer in the JournalPlaybackProc's message queue indicates the current message group was created for a word recognized from the "Choice List" state~1033
        -use MSW PostMessage to send keystroke information represented by wParam and lParam to ChoiceList~1035
        -return with indication the keystroke message which caused KeyboardProc to be called should be discarded~1037
    -...

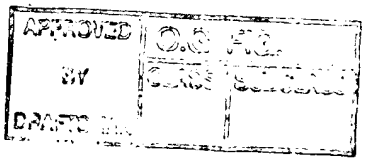
FIG. 50

-MenuStack~1036
    -list of MenuEntry structs~1854, each containing
        -MenuHandle~1856
        -MenuItemID~1858

FIG. 51

-HWndToAppTable~1040
    -a list of entry structs each containing~1654
        -HWnd~1656
        -AppState~1658
        -AppMode~1660
        -ShiftKeyOn~1704
        -ControlKeyOn~1706
        -AltKeyOn~1708

FIG. 52



```
-FastDemon()~1048
    -if DSPBoardPresent is true~1074
        -if RecognizerOn is false~1076
            -if the DSP board is on, stop it~1078
        -else~1080
            -if the DSP board is stopped, start it~1082
            -if have received notification of an utterance detection
            from the DSP board, call RecSetupCallAndOutput for the
            utterance~1083
    -else if DSPBoardPresent is false~1084
        -if RecognizerOn is true~1086
            -perform incremental utterance detection on new signals
            in audio buffer~1088
            -if an utterance is detected, call RecSetupCallAndOutput
            for the utterance~1090
            -while there is more than 1/50 of a second of audio
            signal in the audio buffer~1092
                -for every 1/50 second of the signal~1094
                    -calculate its FFT and Cepstrum~1096
                    -place the FFT and selected Mel Cepstrum values
                    into a frame format~1098
                    -add the frame to end of a frame buffer~1100
    -if  choice list is displayed and ChoiceListOperative is
    false~1104
        -increment DelayCount~1106
        -if DelayCount is => ChoiceListRemovalDelay, remove display
        of choice list~1108
    -...
```

FIG. 53

-RecSetupCallAndOutput(Utterance)~1102
    -if CurrentMode is BaseVocabSelectMode~1154
        -clear StateList and then place in it the state having versions of the PromptedWord from each base vocabulary~1156
        -call Recognize for the utterance with current StateList and with LanguageContext and StartString Nulled~1158
        -use MSW PostMessage to send BaseVocabSelection routine a PromptedUtterance message, with a pointer to the recognition results, including the recognition's score for each of the words from the PromptedWord's corresponding state~1160
        -return~1162
    -else if CurrentMode is TrainWordMode~1164
        -clear StateList and then place PromptedWord in it~1166
        -if the PromptedWord is not a word listed in the "Train Word" state and if OnlyListenForWordsBeingTrained is false, add the "Train Word" state to the StateList~1168
        -call Recognize for the utterance with the current StateList, and with LanguageContext and StartString NULLed~1170
        -use MSW PostMessage to send TrainWordDialog a PromptedUtterance message, with a pointer to the recognition results and with a pointer to the recognition's utterance~1172
        -return~1174
    -else if CurrentMode is CommandMode or DictateMode~1176
        -clear StateList and then add the it the "Always Active" and "Global Commands" states~1178
        -if a call to MSW GetSystemDebugState returns SDS_MENU indicating a menu is currently active~1180
            -set CurrentMode to CommandMode~1182
        -else~1184
            -call ApplicationTracking with a Null HWnd to get the current entry in the HWndToAppTable~1186
            -set CurrentAppState and CurrentMode equal to the AppState and AppMode in the table entry returned~1188
            -add CurrentAppState to StateList~1190
        -if CurrentMode is DictateMode~1192
            -if ChoiceList routine has not been initialized, initialize it~1193
            -if ChoiceListOperative is true add "Choice List" state StateList~1194
            -add "DictateMode" state to StateList~1196
            -call LanguageContextTracking to set the current LanguageContext~1198
        -if CurrentMode is CommandMode~1200
            -call CommandTracking to set the CurrentTrackingState~1202
            -add the CurrentTrackingState to the StateList~1204
            -set LanguageContext to Null~1206

FIG. 54A

-call Recognize for the utterance with its associated LanguageContext and StateList and with StartString Null~1208
-store the utterance just recognized, and the LanguageContext and StateList for the utterance, and its up to nine best scoring words and their associated states in a WordHistoryBuffer~1210
-call PerformWordsOutput for the best scoring word, its associated state, and pointer into utterance's entry in WordHistoryBuffer, if any~1212
-return~1214
-...

FIG. 54B

```
-Recognize(Utterance, LanguageContext, StateList, StartString)~1110
    -if StartString is not empty, limit active vocabulary to words
    in states of StateList which start with the letters of the
    StartString, independent of case~1114
    -if CurrentMode is DictateMode add an initial language context
    component, which depends in part from LanguageContext, to each
    prefilter score~1116
    -score the prefilter start of each word model in the entire
    vocabulary~1118
    -limit active word model candidates to the NumberToPassPrefilter
    words with best scoring prefilter scores, ensuring that all of
    the words in the active vocabulary up to the
    NumberToPassPrefilter are included~1120
    -for each active word model candidate~1122
        -if it is a helper model, create in RAM a list of pointers
        to the PELs listed in that model~1124
        -else if it is a phonetic model,~1126
            -create an empty PEL pointer list in RAM for the
            model~1128
            -for each phoneme in its phonetic spelling~1130
                -define a corresponding PIC according to the phoneme
                and its preceding phoneme or silence and its
                following phoneme or silence~1132
                -add to the model's PEL pointer list a pointer to
                each PEL associated with that PIC~1134
    -for each successive frame of Utterance in frame buffer until
    scoring of all active word candidates is complete~1136
        -for each active word model candidate~1138
            -use the frame to update the relative score of the match
            of the word model against the frame sequence of the
            current Utterance~1140
            -if CurrentMode is DictateMode, if the match procedure
            makes a transition to one of the word models first four
            nodes, add a language context component, which depends
            in part from LanguageContext, to the score~1142
            -if the word model's score is worse than ScoreThreshold,
            remove it from the list of active word model
            candidates~1144
    -place word IDs of the up to NoOfWordsToReturn best scoring
    words from the active vocabulary which score above a given
    threshold, and their corresponding scores, in a results
    buffer~1146
    -for each such word ID, scan active states in the StateList in
    order of the state's priorities, to find the first state in
    which the Word ID occurs and place that state in association
    with the word's ID in the results buffer~1148
    -return with a pointer to the results buffer~1150
```

FIG. 55

↙1114A

-if StartString is not empty~2112
    -for each word in the states of the StateList~2114
        -add the word to the active vocabulary if its spelling contains a MatchingString which meets the following three conditions:~2116
            -each uppercase letter in StartString is matched by the same upper case letter in a corresponding position in the MatchString~2118
            -each lower case letter in in StartString is match by the same letter in either case in a corresponding position in the MatchString~2120
            -The MatchString starts the spelling of the word, except if the word's spelling contains a "[", the matching string can start immediately after the "["~2122

FIG. 55A

-BaseVocabSelection()~1216
    -display Create User dialog box and obtain up to eight character file name from the user~1218
    -display Identify Microphone dialog box and obtain description of user's microphone~1219
    -clear scores for each base vocabulary~1220
    -if user identifies a microphone type, weight scores of the base vocabularies associated with that microphone type~1222
    -load SELECTION.VOC and SELECTION.USR file~1224
    -display Sample Voice dialog box~1226
    -set CurrentMode to BaseVocabSelectMode~1228
    -for each word in prompted word list~1230
        -set PromptedWord equal to the current word~1232
        -prompt user to say PromptedWord by displaying it~1234
        -message loop~1236
            -call MSW GetMessage~1238
            -if receive PromptedUtterance message~1240
                -add score associated with each base vocabulary's version of the word to a total for that base vocabulary~1242
                -if the score of one of the base vocabularies exceeds that of all the others by more than a specified threshold, exit for loop~1244
                -skip to for loops iteration for next word in prompted word list~1246
    -select the base vocabularies whose associated word models have the best score~1248
    -...
    -create a new directory for the user~1250
    -create a copy of the selected base vocabulary's .USR file, with the pre-extension portion of its file name the name entered by the user, in the user's directory so the PIC table and PEL models in that .USR file will be used in the recognition of that user's utterances~1254
    -Set CurrentMode to CommandMode~1256

FIG. 56

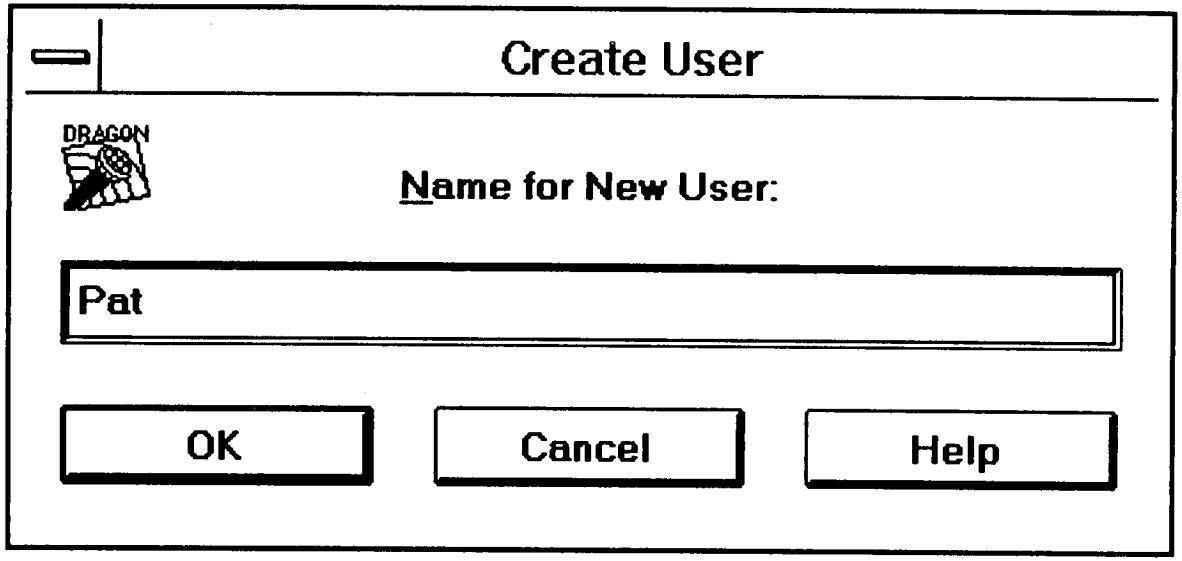


Figure 57

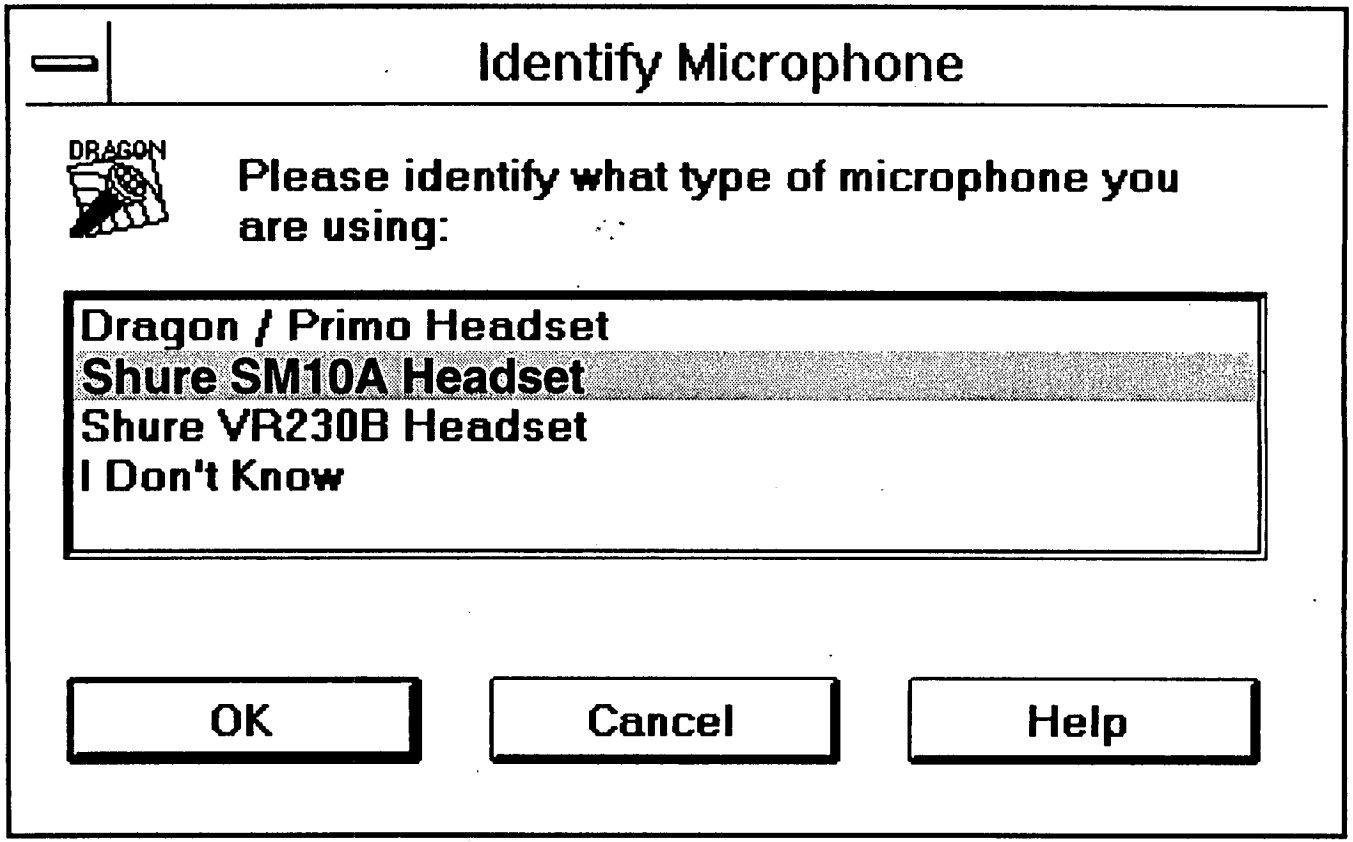


Figure 58

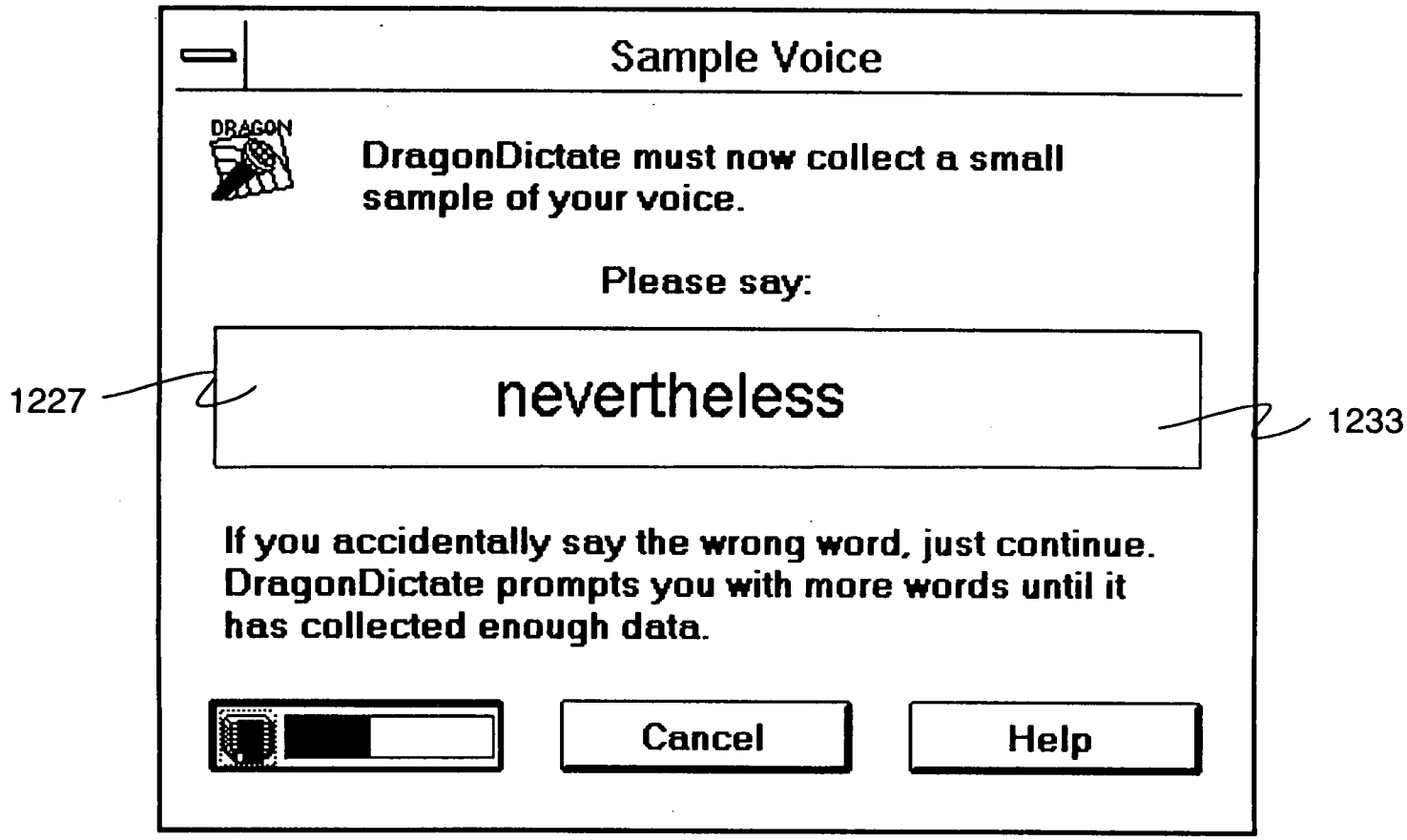


Figure 59

```
-TrainWordDialog(WordList)~1256
    -display Train Word dialog box~1260
    -set CurrentMode to TrainWordMode~1262
    -for each active word on WordList~1264
        -set PromptedWord equal to the word's ID~1266
        -prompt user to say PromptedWord by displaying~1268
        -if the Repetitions button pressed is~1270
            -"Light": set MinRepetitions to 1 and MaxRepetitions to
            3~1272
            -"Normal": set MinRepetitions to 3 and MaxRepetitions to
            5~1274
            -"Intense": set MinRepetitions to 6 and MaxRepetitions
            to 9~1276
        -display MinRepetitions unlit indicator lights~1278
        -set TokensForWord and GoodScoringTokensForWord both to
        zero~1280
        -message loop~1282
            -call MSW GetMessage~1284
            -...
            -if receive PromptedUtterance message~1286
                -if the best scoring word in the recognition results
                associated with the PromptedUtterance message is
                other than the PromptedWord and if that best scoring
                word has a score above a certain threshold, call
                PerformWordsOutput for the best scoring word and its
                associated recognized state~1287
                -else, if the best scoring word in the recognition
                result associated with PromptedUtterance message is
                the PromptedWord and if it has a score above a
                certain threshold~1288
                    -increment TokensForWord~1290
                    -save utterance associated with
                    PromptedUtterance message as a token for
                    PromptedWord~1292
                    -light first unlit indicator light~1294
                    -if score of utterance against the previous
                    model of PromptedWord is better than a specified
                    GoodScore threshold, increment
                    GoodScoringTokensForWord~1296
                    -if TokensForWord => MaxRepetitions or if
                    GoodScoringTokensForWord => MinRepetitions, exit
                    message loop~1298
                    -else if there is no unlit indicator light, add
                    one~1300
            -if [Alt+s)~1304
                -remove Train Word dialog box~1306
                -return~1308
            -...
        -call WordTraining Program subroutine for PromptedWord with
        utterances saved for that word~1310
    -remove Train Word dialog box~1312
    -return~1314
```

FIG. 60

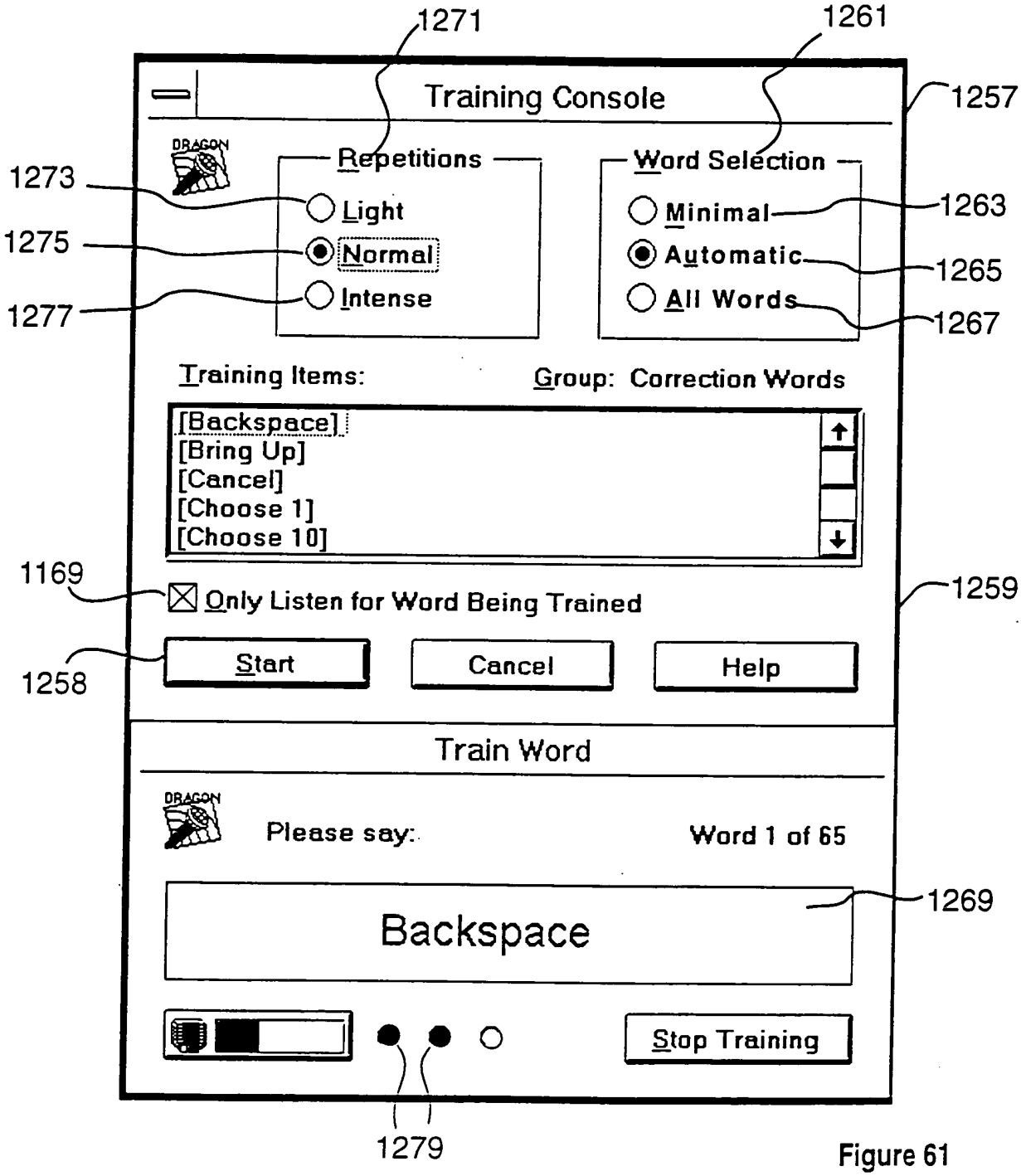


Figure 61

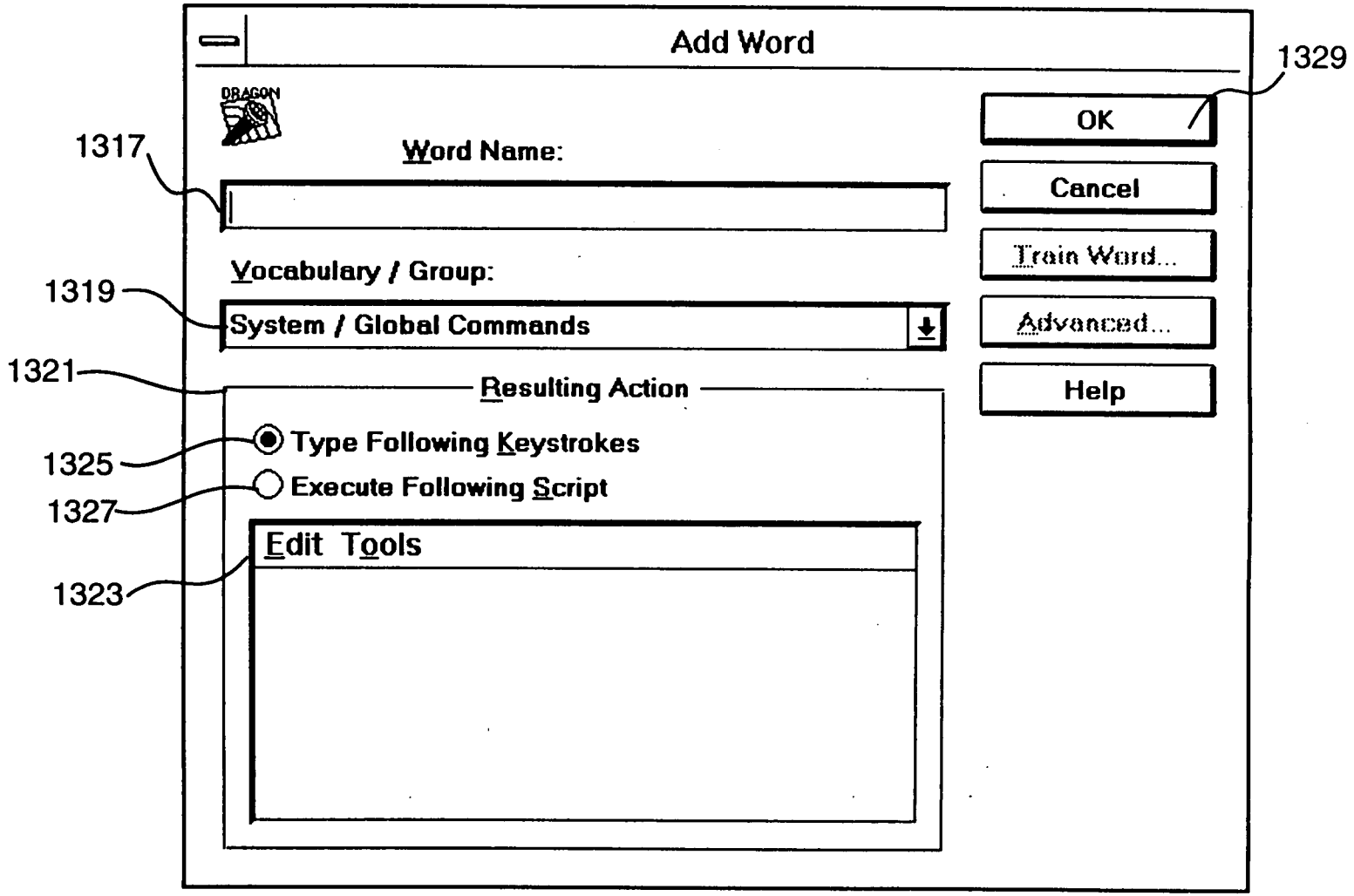


Figure 62

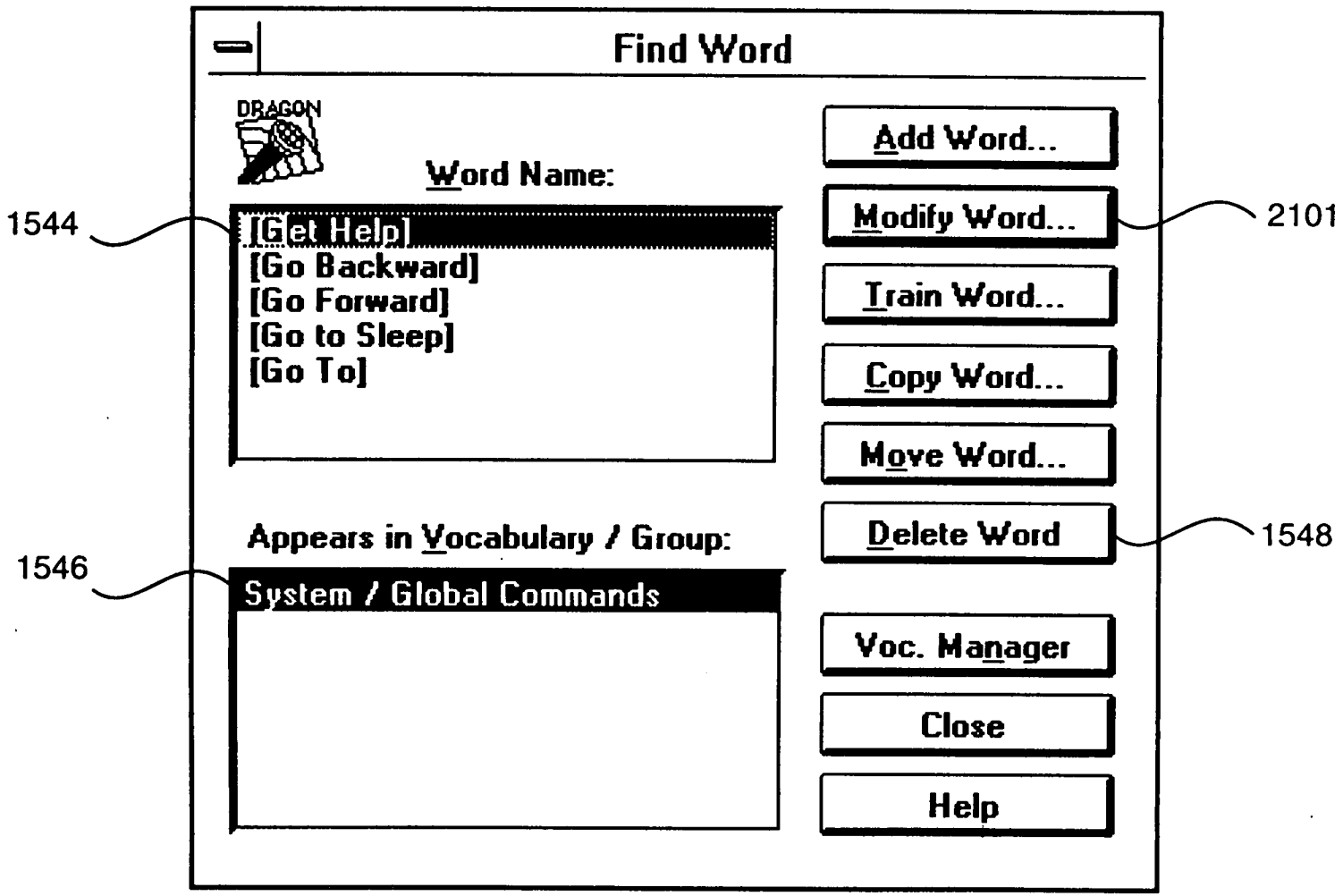


Figure 63

-PerformWordsOutput(Word, State, WordHistoryBufferPointer)~1112
-if ChoiceListOperative is true and the choice list is not the active window~1390
-if State is not "Choice List"use MSW PostMessage to send RemoveChoiceList message to ChoiceList routine~1392
-if Word has any ExtraData in its State~1394
-if first byte in the ExtraData field indicates following bytes are DragonDictate script~1396
-call MacroInterpreter to interpret the script~1398
-return~1400
-else if the first byte in the ExtraData field indicates the following bytes are to be fed to the JournalPlaybackProc~1402
-copy the following ExtraData bytes to TextOutput~1404
-else if Word has no ExtraData in its State~1406
-copy the word's spelling (prior to " []", if any) to TextOutput~1408
-if ShiftKeyOn is true for the currently active window~1410
-capitalize first letter of TextOutput~1412
-set ShiftKeyOn to false for the currently active window~1414
-if ControlKeyOn is true for the currently active window~1416
-replace first character of TextOutput with its control key equivalent~1418
-set ControlKeyOn to false for the currently active window~1420
-if AltKeyOn is true for the currently active window~1422
-replace first character of TextOutput with its alt key equivalent~1424
-set AltKeyOn to false for the currently active window~1426
-copy a message group header, indicating whether or not the characters in TextOutput are associated with a word from the "Choice List" state, into the JournalPlaybackProc's message queue~1427
-copy each character in TextOutput into the JournalPlaybackProc's message queue following the message group header~1428
-call MSW SetWindowsHookEx with WH_JOURNALPLAYBACKPROC to install the hook for the JournalPlaybackProc~1430
-if CurrentMode is DictateMode, and if the state of the best scoring word is other than "Choice List", use MSW PostMessage to send DisplayChoiceList message to ChoiceList routine with WordHistoryBufferPointer, which points to Word's associated the utterance just recognized in WordHistoryBuffer~1432

FIG. 64

-ChoiceList()~1393
    -...
    -message loop~1433
        -call MSW GetMessage~1435
        -if message is~1437
            -DisplayChoiceList message containing a pointer to a specified Utterance in WordHistoryBuffer~1439
                -set ChoiceListOperative to true~1441
                -if the choice list window is not displayed, display it~1443
                -display the up to nine best scoring words stored in the utterance's entry in the WordHistoryBuffer in numbered order~1445
                -clear StartString~1447
            -a printable keystroke message~1449
                -add the key, with its case, to StartString~1451
                -call Recognize for ChoiceList's original utterance, StateList, LanguageContext and current StartString~1453
                -if Recognize comes back with fewer than 9 words, word search .VOC file and backup dictionary for words which match StartString, independent of case, up to the number of remaining unfilled slots in the ChoiceList~1455
                -if best scoring word does not match case of StartString, designate StartString as first choice word, and other words after it in choice order~1457
                -re-display choice list with results of re-recognition and word search, if any~1459
                -use highlighting to indicate which letters of the first choice word in ChoiceList belong to the StartString~1461
            -a "Choose N" message~1463
                -if there is an Nth word in ChoiceList~1465
                    -set ChoiceListOperative to false~1467
                    -remove display of ChoiceList~1469
                    -if first choice word stored in WordHistoryBuffer for ChoiceList's current utterance had a spelling output, output enough keystrokes to delete keystrokes, if any, associated with that prior spelling output~1471
                    -call PerformWordsOutput for Nth word and it corresponding state if any~1475
                -else beep for error~1477
            -RemoveChoiceList message~1479
                -set ChoiceListOperative to false~1481
                -set DelayCount to zero~1483
            -...

FIG. 65

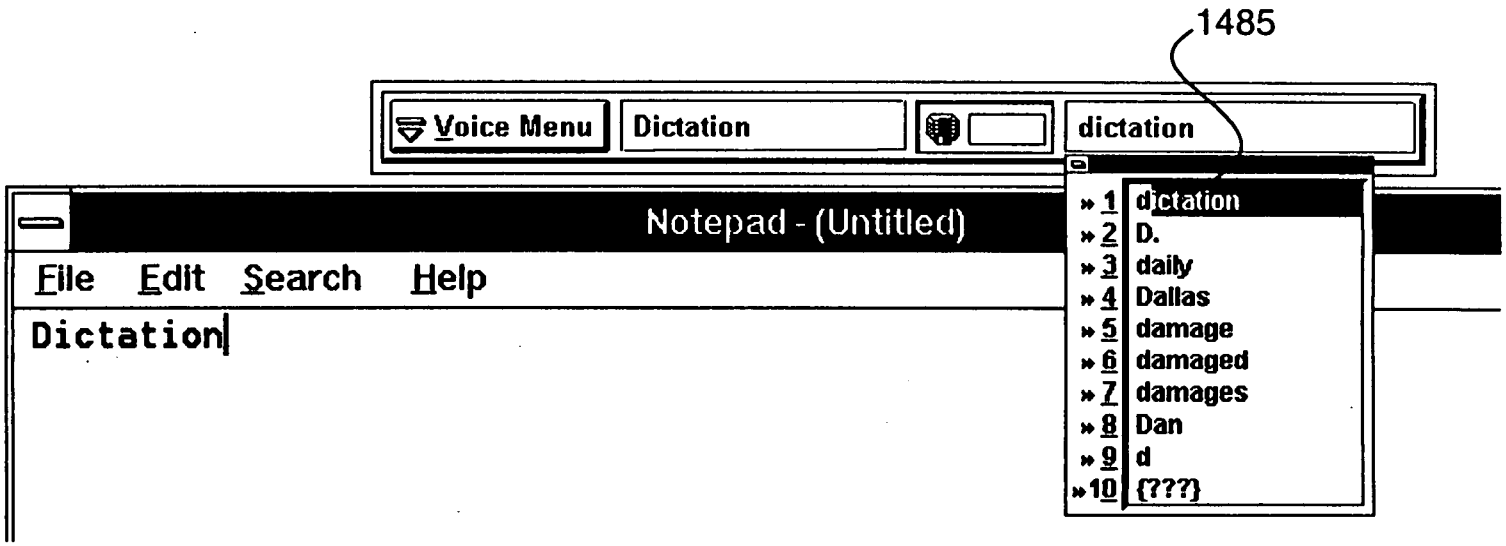


Figure 66

```
-MacroInterpreter(MacroScript)~1382
    -create a MacroInstance for running of current MacroScript~1434
    -...
    -until reach end of the MacroScript~1386
        -find the next macro statement in the MacroScript~1438
        -if statement is~1440
            -"MenuPick[string]": call MenuPick subroutine for the
            string~1442
            -"ControlPick[string]": call ControlPick subroutine for
            the string~1444
            -"SpellMode": and if ChoiceListOperative is true~1446
                -make choice list the active window~1448
                -set CurrentMode to CommandMode~1450
            -"CommandMode":~1452
                -set CurrentMode to CommandMode~1454
                -set the AppMode associated with the currently
                active window in HWndToAppTable to CommandMode~1456
            -"DictateMode":~1458
                -set CurrentMode to DictateMode~1460
                -set the AppMode associated with the currently
                active window in HWndToAppTable to CommandMode~1462
            -"MicrophoneOff":~1464
                -set RecognizerOn to false~1466
                -set MicOffConfirmed to false~1468
            -"MicrophoneOn":~1470
                -set RecognizerOn to true~1472
                -set MicOffConfirmed to false~1473
            -"ShiftKey": set the ShiftKeyOn value in the currently
            active window's entry in the HWndToAppTable to true~1476
            -"ControlKey": set the ShiftKeyOn value in the currently
            active window's entry in the HWndToAppTable to true~1478
            -"AltKey": set the ShiftKeyOn value in the currently
            active window's entry in the HWndToAppTable to true~1480
            -...
    -delete current MacroInstance~1482
    -return~1484
```

FIG. 67

```
-JournalPlaybackProc(code, wParam, lParam)~1403
    -if code equals HC_GETNEXT~1487
        -copy the unread message element pointed to by, or
        following, the JournalPlaybackProc's read pointer to the
        location in memory pointed to by lParam~1488
    -else if code equals HC_SKIP~1489
        -increment the read pointer to the next unread message
        element, if there is one~1490
        -if the read pointer points past the last unread message
        element in the message queue~1492
            -call MSW UnhookWindowsHookEx for the
            JournalPlaybackProc to de-active its hook~1494
            -clear the message queue and zero the read and write
            pointers~1496
    -return~1498
```

FIG. 68

```
-WordTraining(Word, TokenList)~1311
    -if Word has one or more models~1502
        -if Word has more than one word model~1504
            -score each token in the TokenList against each of
            Word's word models~1506
            -associate each token with the word model against which
            it scores best~1508
        -else, associate each token with Word's single model~1510
        -for each of Word's pronunciations with which tokens have
        been associated ~1512
            -set GoodSpelledModelTokens and GoodHelperModelTokens to
            0~1516
            -if the pronunciation has a spelled model, call Training
            to adapt that spelled model with all the tokens
            associated with the pronunciation's phonetic or helper
            model, adding the number of such tokens that were
            successfully used to adapt the spelled model to
            GoodSpelledModelTokens~1518
            -if the pronunciation has a helper model, call Training
            to adapt that helper model with all the tokens
            associated with the pronunciation's phonetic or helper
            model, adding the number of such tokens that were
            successfully used to adapt the spelled component as
            GoodHelperModelTokens~1520
            -if GoodHelperModelTokens and GoodSpelledModelTokens are
            both 0~1522
                -if pronunciation has a helper model, delete it~1524
                -call TrainNewModel to build a new helper model for
                the pronunciation using all of the tokens associated
                with the pronunciation~1526
            -else, if there is a helper model and GoodHelper-
            ModelTokens is 0~1528
                -delete the helper model~1530
    -else if Word had no models~1532
        -call TrainNewModel to build a helper model for Word using
        all of the token in the TokenList~1534
    -return~1536
```

FIG. 69

```
-States
    -vocabulary System
        -group System
            -group "Always Active"~1568
                -"[Command Mode]" /script "CommandMode"~1570
                -"[Dictate Mode]" /script "DictateMode"~1572
                -"[Go to Sleep]" /script "GoToSleep"~1574
                -[Oops] /script "WordHistory 1"~1576
                -"[What Can I Say]" /script
                "ShowRecognitionGroups"~1578
            -group "Global Commands"~1580
                -...
                -"[Shift Key]" /script "ShiftKey"~1582
                -"[Alt Key]" /script "AltKey"~1584
                -"[Control Key]" /script "ControlKey"~1586
                -...
                -"a [alpha]"~1588
                -"b [bravo]"~1588
                -"c [charlie]"~1588
                -"d [delta]"~1588
                -"e [echo]"~1588
                -"f [foxtrot]"~1588
                -"g [golf]"~1588
                -"h [hotel]"~1588
                -"i [india]"~1588
                -"j [juliett]"~1588
                -"k [kilo]"~1588
                -"l [lima]"~1588
                -"m [mike]"~1588
                -"n [november]"~1588
                -"o [oscar]"~1588
                -"p [papa]"~1588
                -"q [quebec]"~1588
                -"r [romeo]"~1588
                -"s [sierra]"~1588
                -"t [tango]"~1588
                -"u [uniform]"~1588
                -"v [victor]"~1588
                -"w [whiskey]"~1588
                -"x [xray]"~1588
                -"y [yankee]"~1588
                -"z [zulu]"~1588
                -...
                -"[Spell Mode]" /script "SpellMode"~1590

            -group  "Choice List"~1712
                -...
                -"[Choose 1]" /keys {Alt+1}{Enter}
                -"[Choose 2]" /keys {Alt+2}{Enter}
                -"[Choose 3]" /keys {Alt+3}{Enter}
                -"[Choose 4]" /keys {Alt+4}{Enter}
```

FIG. 70A

```
                -"[Choose 5]" /keys {Alt+5}{Enter}
                -"[Choose 6]" /keys {Alt+6}{Enter}
                -"[Choose 7]" /keys {Alt+7}{Enter}
                -"[Choose 8]" /keys {Alt+8}{Enter}
                -"[Choose 9]" /keys {Alt+9}{Enter}
                -"[Choose 10]" /keys {Alt+0}{Enter}
                -...
    -vocabulary Voicebar
        -group Voicebar
            -...
            -group "Train Word"~1285
                -"[Stop Training]" /keys {Alt+s}~1289
            -...
```

FIG. 70B

```
-AddWordDialog(State)~1316
    -...
    -message loop~1318
        -call MSW GetMessage
        -...
        -if message is "OK"~1320
            -...
            -if there is a valid word name string in the Word Name
            edit box and a valid state selected in the
            Vocabulary/Group ComboBox~1322
                -call FindOrMakeMatchingWord for the string to find
                or make a word ID corresponding to that string~1326
                -if the word ID is not listed in the selected state,
                create an entry for it in the selected state~1328
                -if there is a string in the Resulting Actions edit
                box, place string in word's ExtraData field in
                state, preceded by Keystrokes or Script byte,
                depending upon whether keystroke or Script radio
                button is selected~1330
            -remove Add Word dialog box~1332
            -return~1334
            -...
        -...
```

FIG. 71

```
-FindOrMakeMatchingWord(String)~1336
    -scan .VOC file for word with a spelling matching String~1338
    -if find one, return with matching word's ID~1340
    -else ~1342
        -create a new word ID in .VOC file, set its spelling equal
        to String, and give it an empty phonetic spelling list~1344
        -if String contains a portion of text inside a top level
        "[]", set String equal to that portion of text~1346
        -strip all punctuation characters besides apostrophes~1348
        -clear IDQueue~1350
        -for each successive word in String~1352
            -scan .VOC file for word with spelling matching the
            successive word~1354
            -if find one, place ID of word in IDQueue~1356
            -else~1358
                -return with the new word's ID~1360
        -place one empty phonetic spelling in the new word's
        phonetic spelling list~1362
        -for each ID in IDQueue~1364
            -if the ID's word has no phonetic spelling~1366
                -empty the word's phonetic spelling list~1368
                -return with the new word's ID~1370
            -for each phonetic spelling of the ID's word~1372
                -for each prior spelling in the new word's phonetic
                spelling list~1374
                    -if the total number of spelling's in the
                    phonetic spelling list created in conjunction
                    with the current ID is less than
                    SpellingNumberLimit, create a spelling which
                    concatenates the ID's current phonetic spelling
                    to the end of the prior phonetic spelling,
                    altering phonemes near the boundary of its
                    concatenated spelling if required by
                    coarticulation rules~1376
            -remove the prior phonetic spellings~1378
        -return with new word's ID~1380
```

FIG. 72

```
-FindWordDialog~1550
    -...
    -message loop~1552
        -call MSW GetMessage~1554
        -if message is~1556
            -...
            -"Delete"~1558
                -if a word has been selected for deletion in
                conjunction with a given path listed in the
                Vocabulary/Group ComboBox, delete the selected word
                from the state indicated in the Vocabulary/Group
                ComboBox~1560
                -...
            -...
        -...
```

FIG. 73

```
-ApplicationTracking(HWnd)~1594
    -if HWnd is Null~1596
        -call MSW GetActiveWindow to get the handle of the currently
        active window~1598
        -set HWnd equal to active window handle~1600
    -if HWnd has an entry in HWndToAppTable, return with that entry
    as the SelectedEntry~1602
    -else~1604
        -add a new entry to HWndToAppTable with HWnd, CommandMode as
        its AppMode, an empty AppState, and ShiftKeyOn,
        ControlKeyOn, and AltKeyOn all set to false~1606
        -make the new entry the SelectedEntry~1608
        -call MSW GetWindowWord to get the hinstance of the program
        module running the HWnd's window~1610
        -call MSW GetModuleFileName for that hinstance to get the
        file name of the program which is running HWnd's window~1612
        -compare the file name returned against a list of file names
        associated with stored application states~1614
        -if find a match, set the new entry's AppState equal to the
        state associated with the matching file name~1618
        -else if the file name returned by MSW GetModuleFileName is
        that associated with a MSW file for running MS-DOS
        applications in a window~1620
            -call MSW GetWindowText for HWnd to get the text of its
            window's title bar~1622
            -compare the text returned with a list of text
            associated with application states~1624
            -if find a match, set the new entry's AppState equal to
            the state associated with the matching text~1628
        -if the new entry's AppState is still empty~1630
            -create a new temporary logical state for its
            application~1632
            -set the new entry's AppState equal to the new temporary
            logical state~1634
        -if a call to MSW GetWindow with GW_OWNER for HWnd's window
        indicates the window is a dialog box~1636
            -call MSW GetWindowText for the caption text of the
            dialog box~1638
            -if that text corresponds to the name of a sub-state
            within the AppState of the new entry~1640
                -change the new entry's AppState to that sub-
                state~1642
            -else~1644
                -create a temporary sub-state in the state stored in
                the current entry's AppState~1646
                -place that sub-state in the current entry's
                AppState~1648
    -return with the SelectedEntry~1650
```

FIG. 74

```
-LanguageContextTracking()~1714
    -call MSW GetFocus to get the handle of the window currently
    having the focus~1716
    -use MSW SendMessage to send the focus window the WM_GETDLGCODE
    message to find out if the focus window is a Multi-Line Edit
    control (MLE)~1718
    -if it is an MLE~1720
        -use MSW SendMessage to send EM_GETSEL to the MLE to get the
        character index of the starting position of the current
        selection~1722
        -use MSW SendMessage to send EM_LINEFROMCHAR to the MLE with
        the character index of the start of the current selection to
        get the line number in the MLE of the line on which the
        current selection starts~1724
        -use MSW SendMessage to send EM_GETLINE to the MLE with the
        line number of the current line to get a copy of that
        line~1726
        -use MSW SendMessage to send EM_LINEINDEX to the MLE with
        the line number of the current line to get the character
        index of start of that line~1728
        -subtract the index of the start of the current line from
        the index of the start of the current selection to determine
        the position in the copy of the current line of the start of
        the current selection~1730
        -starting backward from that position, look in the current
        line for last complete word before the current selection,
        and if that last complete word extends back into the
        previous line look for it in that previous line by using
        EM_LINEFROMCHAR AND EM_GETLINE~1732
        -if there is such a last complete word, set LanguageContext
        equal to it~1734
        -else, set LanguageContext to Null~1736
        -return~1738
    -else if CurrentAppState is associated with an external
    application which has a predefined interface for providing
    language context~1740
        -send a message to that predefined interface to obtain its
        language context~1742
        -set language context equal to that context~1744
        -return~1746
    -...
    -set LanguageContext to Null~1748
    -return~1750
```

FIG. 75

```
-CommandTracking()~1752
    -clear the CommandPhraseList~1754
    -if a call to MSW GetSystemDebugState returns SDS_MENU,
    indicating a menu is currently active~1756
        -for the menu handle of each entry in MenuStack~1758
            -call GetMenuCommandPhrases~1760
    -else~1762
        -call MSW GetActiveWindow to get the handle of the currently
        active window~1764
        -if a call to MSW GetMenu for the active window returns a
        menu handle, call GetMenuCommandPhrases for the menu~1766
        -if a call to MSW GetSystemMenu returns a menu handle to a
        copy of the system menu, call GetMenuCommandPhrases for the
        copy of the system menu~1768
        -use one or more calls to MSW GetWindow to perform a tree
        search for the handles of all windows, if any, included in
        active window~1770
        -for each window handle obtained~1772
            -if a call to MSW SendMessage sending the window a
            WM_GETDLGCODE message returns an indication the window
            is not a control window, skip to the iteration for the
            next window handle~1774
            -else if a call to IsWindowClickable indicates the
            window is not clickable, skip to the iteration for the
            next window handle~1776
            -else~1778
                -add an empty CommandPhraseEntry in the
                CommandPhraseList~1780
                -call MSW SendMessage to send the window a
                WM_GETTEXT message to get the control's associated
                text~1782
                -if the value returned in response to the
                WM_GETDLGCODE message indicated the window is a
                static control~1784
                    -if the control's text has an accelerator, save
                    a command to feed the accelerator key to the
                    JournalPlaybackProc in the CommandPhraseEntry's
                    CommandOutput~1788
                    -else~1790
                        -delete the empty CommandPhraseEntry created
                        for this window handle~1792
                        -skip to the iteration for the next window
                        handle~1794
                -call StripControlOrMenuItemName with String equal
                the control's text and TextType equal Control~1796
                -if StripControlOrMenuItemName returns with an empty
                ReturnStringList, delete the current window's
                CommandPhraseEntry and skip to iteration for next
                window~1798
                -else~1800
```

FIG. 76A

```
                -place the ReturnStringList's first string in
                the CommandPhraseEntry's CommandPhrase field,
                enclosed in "[]"~1802
                -if the CommandPhraseEntry's CommandOutput is
                empty fill it with a "ControlPick[first string]"
                script command~1804
                -if the ReturnStringList has a second
                string~1806
                    -add a copy of the CommandPhraseEntry to the
                    CommandPhraseList and copy the second string
                    enclosed in "[]" into its CommandPhrase
                    field~1808
                    -if the additional CommandPhraseEntry's
                    CommandOutput is empty fill it with a
                    "ControlPick[second string]" script
                    command~1810
        -check to see if there is a tracking state in the tracking state
        cache which includes the exact same collection of command
        phrases as the active window's CommandPhraseList~1812
        -if so~1814
            -make the matching tracking state the
            CurrentTrackingState~1816
            -set the matching tracking state's LastUsedTime to the
            current time~1818
        -else~1820
            -create a new, empty, tracking state~1822
            -for each CommandPhraseEntry of the CommandPhraseList~1824
                -call FindOrMakeMatchingWord for the CommandPhrase~1826
                -place the word ID, if any, returned by
                FindOrMakeMatchingWord in the new tracking state~1828
                -load the word ID's associated ExtraData field in the
                new tracking state with the value of the
                CommandPhraseEntry's CommandOutput~1830
            -if the tracking state cache has the maximum number of
            tracking states recorded in it, delete from the cache the
            tracking state with the oldest LastUsedTime~1832
            -store the new tracking state in the tracking state
            cache~1834
            -make the new tracking state the CurrentTrackingState~1836
            -set the new tracking state's LastUsedTime to the current
            time~1838
        -return~1840
```

FIG. 76B

```
-CommandPhraseList,~1842
    -a list of CommandPhraseEntry structs~1844, each containing
        -CommandPhrase~1846
        -CommandOutput~1848
        -MenuHandle~1850
        -MenuItemPosition~1852
```

FIG. 77

```
-GetMenuCommandPhrases(hmenu)~1860
    -set NumberOK and LastItemWasSeparatorOrNumber to false~1862
    -call MSW GetMenuItemCount to get number of items in the menu
    for which this subroutine was called~1864
    -for each of those items starting with the first~1866
        -call MSW GetMenuItemID to get the menu item's ID~1868
        -if MSW GetMenuItemID returns an indication the menu item is
        a separator, set LastItemWasSeparatorOrNumber to true~1870
        -else~1872
            -create an additional CommandPhraseEntry in the
            CommandPhraseList~1874
            -call MSW GetMenuString to get the menu item's
            spelling~1876
            -if LastItemWasSeparatorOrNumber is true, set NumberOK
            to true~1878
            -else set NumberOK to false~1880
            -call StripControlOrMenuItemName with String equal to
            the menu item's spelling, with TextType equal Menu, and
            with the current value of NumberOK~1882
            -if StripControlOrMenuItemName returns with an empty
            ReturnStringList, delete the CommandPhraseEntry~1884
            -else~1886
                -place the first string in the ReturnStringList in
                the CommandPhraseEntry's CommandPhrase enclosed in
                "[]"~1888
                -place a "MenuPick[first string]" script command in
                the CommandPhraseEntry's CommandOutput~1890
                -place the menu's menu handle in the
                CommandPhraseEntry's MenuHandle and the menu item's
                position in the CommandPhraseEntry's
                MenuItemPosition~1892
                -if there is a second string in the
                ReturnStringList~1894
                    -add a copy of the CommandPhraseEntry to the
                    CommandPhraseList~1896
                    -place the second string into the copy's
                    CommandPhrase field enclosed in "[]"~1898
                    -place a "MenuPick[second string]" script
                    command in the copy's CommandOutput~1900
    -return~1902
```

FIG. 78

```
-StripControlOrMenuItemName(String, TextType, NumberOK,
LastItemWasSeparatorOrNumber)~1904
    -if TextType is Menu, if NumberOK is true, and if first
    character in first String is an "&" followed by a numeral and
    then a space or tab~1908
        -set String equal to spelling of the numeral~1910
        -place String in ReturnStringList~1912
        -set LastItemWasSeparatorOrNumber to true~1914
        -return with ReturnStringList~1916
    -set LastItemWasSeparatorOrNumber to false~1917
    -if String contains a top level matching pair of
    parenthesis~1918
        -place two strings in the ReturnStringList, one
        corresponding to the part of String before the parenthesis,
        and one corresponding to the entire String~1920
    -else place String in the ReturnStringList~1922
    -for each string in the ReturnStringList~1924
        -strip any "&" associated with an accelerator from a
        String~1926
        -strip any leading spaces~1928
        -strip any trailing combination of spaces, periods, colons,
        and exclamation marks~1930
        -strip any character, such as a tab, with a value of 20 Hex
        or less, and any characters following it~1932
        -if the string contains three or more numeric fields
        separated by non-numeric characters remove the string from
        the ReturnStringList~1934
    -return with the ReturnStringList~1938
```

FIG. 79

```
-IsWindowClickable (HWnd)~1940
    -call MSW GetWindowRect to get the screen coordinates of the
    window's bounding rectangle~1942
    -for each of the center point and four corner points of the
    bounding rectangle~1944
        -if a call to MSW WindowFromPoint indicates the window is
        the top window at that point, return with the current
        point~1946
        -else~1948
            -if using MSW SendMessage to send the WM_NCHITTEST
            message returns HTTRANSPARENT, assume the top window is
            a group box and return with the current point~1950
    -return with an indication that there is no clickable point in
    the window~1952
```

FIG. 80

```
-MenuPick(String)~1954
    -clear the KeystrokeHistoryString~1958
    -if a call to MSW GetSystemDebugState returns SDS_MENU,
    indicating that a menu is currently active~1960
        -for each MenuEntry in MenuStack, starting at the end~1962
            -clear CommandPhraseList~1964
            -call GetMenuCommandPhrases for the MenuEntry's
            MenuHandle~1966
            -for each CommandPhraseEntry placed in the
            CommandPhraseList by GetMenuCommandPhrases~1968
                -if the spelling within the "[]" of its
                CommandPhrase matches String~1970
                    -add to the KeystrokeHistoryString the arrow
                    keystrokes necessary to move from the position
                    of the MenuEntry's MenuItemID to that associated
                    with the CommandPhraseEntry's
                    MenuItemPosition~1972
                    -add "enter" to the KeystrokeHistoryString~1974
                    -use the JournalPlaybackProc to playback the
                    KeystrokeHistoryString~1976
                    -return~1978
            -add an "escape" key to the KeystrokeHistoryString~1980
            -delete the last MenuEntry from the end of the
            MenuStack~1982
    -else~1984
        -call MSW GetActiveWindow, GetMenu, and GetSystemMenu to get
        the active window's main menu and its system menu~1986
        -clear the CommandPhraseList~1988
        -for the active window's menu call
        GetMenuCommandPhrases~2000
        -for the active window's system menu call
        GetMenuCommandPhrases~2002
        -for each CommandPhraseEntry in the CommandPhraseList~2004
            -if the spelling within "[]" of its CommandPhrase
            matches String~2006
                -if the CommandPhraseEntry's MenuHandle is that of
                active window's main menu, add to the
                KeystrokeHistoryString an "Alt" followed by the
                arrow keystrokes necessary to go from first item in
                the menu to the CommandPhraseEntry's
                MenuItemPosition, followed by an "Enter"~2008
                -else if its menu handle is that of the active
                window's system menu, add to the
                KeystrokeHistoryString an "Alt-Spacebar" followed by
                the arrow keystrokes necessary to go from the first
                item in the system menu to the item represented by
                the MenuItemID of the matching CommandPhraseEntry,
                followed by an "Enter"~2010
                -use the JournalPlaybackProc to play keystrokes back
                to active application~2012
                -return~2014
    -display an error message~2016
    -return~2018
```

FIG. 81

```
-ControlPick(String)~1956
    -call MSW GetActiveWindow to get the handle of the currently
    active window~2020
    -use one or more calls to MSW GetWindow to perform a tree search
    for the handles of all child windows, if any, included in the
    active window~2022
    -for each child window handle obtained~2024
        -if using MSW SendMessage to send the child window the
        WM_GETDLGCODE message returns an indication the child window
        is not a non-static control, skip to the iteration for the
        next child window~2026
        -call MSW SendMessage to send the child window a WM_GETTEXT
        message to get the control window's associated text~2028
        -call StripControlOrMenuItemName with window's text as
        String and with TextType equal to Control~2030
        -if any string in the ReturnStringList returned by
        StripControlOrMenuItemName matches the String with which
        ControlPick was called~2032
            -if a call to IsWindowClickable for the window returns a
            clickable point, uses the JournalPlaybackProc to send
            the window the WM_LBUTTONDOWN and then the WM_LBUTTONUP
            messages at that point~2034
            -return~2036
    -if no control window with text matching ControlPick's String is
    found, display an error message.~2038
    -return~2040
```

FIG. 82

```
-PropertiesTabOfAdvancedModifyWordDialog(Word, State)~2054
    -...
    -message loop~2056
        -call MSW GetMessage~2058
        -if message is~2060
            -...
            -OK~2062
                -if Forget Training button is pressed, remove word's
                helper model from .USR file~2064
                -...
            -...
        -...
    -...
```

FIG. 85 B

-if Forget Training button is pressed, remove word's helper model from .USR file and reset the PIC and PEL counts on each of the word's PIC's and PEL's~2064A

FIG. 85A

```
-SlowDemon()~2074
        -...
        -if HandsFree is true, RecognizerOn is false,
        MicOffConfirmed is false, and if (either there are no
        MacroInstances or there is at least one MacroInstance
        waiting for user input), call MicrophoneWarning~2076
        -...
```

FIG. 87

```
-MicrophoneWarning()~2078
    -set CurrentMode to CommandMode~2080
    -set RecognizerOn to true~2082
    -call MSW MessageBox to display, get input from, and remove
    Microphone Warning message box~2084
    -if MSW MessageBox returns with~2086
        -Yes~2088
            -set RecognizerOn to false~2088
            -set MicOffConfirmed to true~2090
    -return~2092
```

FIG. 88